

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

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|---------------------------------|---|-------------------------------|
| MIDAS GREEN TECHNOLOGIES, LLC, | § | |
| | § | |
| Plaintiff, | § | |
| | § | |
| v. | § | CIVIL ACTION NO. 6:24-CV-166- |
| | § | ADA |
| GREEN REVOLUTION COOLING, INC., | § | |
| | § | |
| Defendant. | § | |
| | § | |

**DECLARATION OF ASHLEY N. MOORE IN SUPPORT OF DEFENDANT GREEN
REVOLUTION COOLING, INC.'S OPENING CLAIM CONSTRUCTION BRIEF**

I, Ashley N. Moore, hereby declare as follows:

1. I am an attorney at law duly licensed to practice law in the State of Texas, admitted to the United States District Court for the Western District of Texas, and am a shareholder of the law firm of Greenberg Traurig, LLP, attorneys of record for Green Revolution Cooling, Inc. (“GRC”) in the above entitled action, and make this declaration in support of GRC’s Opening Claim Construction Brief. Unless otherwise stated, I have personal knowledge of the facts set forth in this declaration, and if called as a witness, could and would competently testify as set forth below.

2. Attached hereto as Exhibit 1 is a true and correct copy of the claim construction Order (Dkt. 84), entered on November 22, 2021, in the case captioned *Midas Green Technologies, LLC v. Immersion Systems, LLC*, No. 4:20-cv-00555-O (N.D. Tex.).

3. Attached hereto as Exhibit 2 is a true and correct copy of the Joint Stipulation on Claim Construction (Dkt. 50), filed on July 11, 2022, in the case captioned *Green Technologies, LLC v. Rhodium Enterprises, Inc., et al.*, No. 6:22-cv-00050-ADA (W.D. Tex.).

4. Attached hereto as Exhibit 3 is a true and correct copy of excerpts of Exhibit A of Plaintiff’s Preliminary Infringement Contentions, served on August 9, 2024.

5. Attached hereto as Exhibit 4 is a true and correct copy of the November 4, 2016 Non-Final Rejection, in the file history for application number 14/355,533, which issued as U.S. Patent No. 10,405,457.

6. Attached hereto as Exhibit 5 is a true and correct copy of the January 31, 2017 Amendment and Response to Non-Final Rejection, in the file history for application number 14/355,533, which issued as U.S. Patent No. 10,405,457.


7. Attached hereto as Exhibit 6 is a true and correct copy of the May 17, 2017 Final Rejection, in the file history for application number 14/355,533, which issued as U.S. Patent No. 10,405,457.

8. Attached hereto as Exhibit 7 is a true and correct copy of the June 11, 2018 Non-Final Rejection, in the file history for application number 14/355,533, which issued as U.S. Patent No. 10,405,457.

9. Attached hereto as Exhibit 8 is a true and correct copy of the July 6, 2017 Notice of References Cited, in the file history for application number 14/355,533, which issued as U.S. Patent No. 10,405,457.

10. Attached hereto as Exhibit 9 is a true and correct copy of the June 28, 2017 Applicant Initiated Interview Summary, in the file history for application number 14/355,533, which issued as U.S. Patent No. 10,405,457.

Dated: November 25, 2024



Ashley N. Moore

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF TEXAS
FORT WORTH DIVISION**

**MIDAS GREEN TECHNOLOGIES,
LLC,**

Plaintiff/Counter-Defendant,

v.

IMMERSION SYSTEMS, LLC,

Defendant/Counter-Claimant.

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Civil Action No. 4:20-cv-00555-O

ORDER

Before the Court are Defendant Immersion Systems LLC's Opening Claim Construction Brief (ECF No. 74), filed September 24, 2021; Plaintiff Midas Green Technologies, LLC's Opening Claim Construction Brief (ECF No. 76), filed September 24; Immersion's Response (ECF No. 78), filed October 8; Midas's Response (ECF No. 80), filed October 8; and the Joint Claim Construction Chart (ECF No. 82), filed October 15.

Midas filed this lawsuit against Immersion, alleging infringement of two patents. Immersion denies that it has infringed any patents and argues that Midas's patents are invalid and unenforceable. Before reaching those issues, the parties ask the Court to resolve a dispute over the construction of two terms in the patent claims. The Court will also take this opportunity to adopt the agreed-upon constructions of the nineteen terms listed in the Joint Claim Construction Chart.

I. BACKGROUND

Midas is the assignee of two patents that concern the liquid cooling of electronic appliances. The first patent is registered as U.S. Patent No. 10,405,457 ("the '457 Patent"). Def.'s App. 6, ECF No. 75. The second patent is a continuation of the '457 Patent and is registered as U.S. Patent No. 10,820,446 ("the '446 Patent"). *Id.* at 22.

EXHIBIT

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The patents describe a tank in which electronic appliances are immersed in a cooling fluid. *Id.* at 16, 32. A device on the bottom of the tank dispenses the fluid, which travels upward to the top of the tank. *Id.* When the fluid approaches the top, it reaches a horizontal slot called a “weir.” *Id.* The fluid flows through the weir into a reservoir so that it can be repressurized, cooled, and recirculated through the system. *Id.* The technology has applications in data centers and cryptocurrency farming operations. *See* Pl.’s Br. 5, ECF No. 76.

On May 29, 2020, Midas sued Immersion for infringement of its patents. It asserts infringement of Claims 1, 6, and 11 of the ’457 Patent, and Claims 1 and 6 of the ’446 Patent. Compl. 7–8, ECF No. 1. Immersion responded by denying that it infringed any patents and asserting that the patents are invalid and unenforceable under 35 U.S.C. §§ 102, 103, and 112. Answer 11–13, ECF No. 17.

Following the Court’s Scheduling Order, the parties submitted briefs regarding the construction of terms and phrases in both patents. They agree on the construction of nineteen terms and phrases. *See* Joint Claim Construction Chart 1–4, ECF No. 82-1. They dispute, however, the proper construction of two phrases:

- 1) “a weir . . . adapted to facilitate substantially uniform recovery,”¹ and
- 2) “a weir . . . having an overflow lip adapted to facilitate substantially uniform recovery.”²

The parties agree that a “weir” is “an overflow structure or barrier that determines the level of liquid.” *Id.* at 1. They also agree that “substantially uniform recovery” should be given its plain and ordinary meaning. *Id.*

¹ The first phrase appears in Claim 11 of the ’457 Patent and Claims 1 and 6 of the ’446 Patent. *See* Def.’s App. 15–16, 31, ECF No. 75.

² The second phrase appears in Claims 1 and 6 of the ’457 Patent. *See id.* at 15.

The dispute comes down to the meaning of “an overflow lip.” The ’457 Patent describes “a weir . . . *having an overflow lip* adapted to facilitate substantially uniform recovery” of the fluid. Def.’s App. 19, ECF No. 75 (emphasis added). The ’446 Patent, which followed the ’457 Patent, omits the phrase “having an overflow lip,” and instead describes “a weir . . . adapted to facilitate substantially uniform recovery” of the fluid. *Id.* at 35. The issue is whether there is a difference between a “weir” and a “weir having an overflow lip.”

Immersion contends there must be a difference between the two phrases. It begins with the premise that different terms are presumed to have different meanings. *See* Def.’s Br. 15, ECF No. 74. So, Immersion argues, there must be a difference between the claims that include the phrase “having an overflow lip” and those that do not. And because the patents do not define what that difference is, Immersion argues the patents are indefinite under 35 U.S.C. § 112(b) and, thus, invalid.

Midas rejects Immersion’s premise that the two phrases have different meanings. According to Midas, the inclusion of the phrase “having an overflow lip” is a redundancy; a “weir” and “a weir having an overflow lip” are the same thing. *See* Pl.’s Resp. Br. 7, ECF No. 80. Midas therefore argues that the two phrases need no construction because their meanings are plain. *See* Pl.’s Br. 1, ECF No. 76. In the alternative, Midas suggests that the meaning of the two phrases can be simplified by construing “adapted to facilitate” to mean “capable of easing or helping.” *Id.*

II. LEGAL STANDARDS

In a patent infringement case, a court first determines the proper construction of the patent claims as a matter of law, establishing the scope of the patentee’s rights. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 321 (2015). The trier of fact may then be called upon to compare the properly construed claims to the allegedly infringing devices to determine whether there has been an infringement. *Id.*

Claim construction is the process of identifying the proper meaning of the claim language. “[T]he words of a claim ‘are generally given their ordinary and customary meaning.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (citation omitted). That is, a claim term is given “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either in the specification or during prosecution.” *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (internal quotation marks and citation omitted).

Courts begin the plain-meaning analysis by looking at the patent’s intrinsic record, which consists of the claims, specification, and prosecution history. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). The words of the claims are generally given their ordinary meaning, but “it is always necessary to review the specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning.” *Id.* “[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Id.* A court may also consider the patent’s prosecution history, if in evidence. *Id.*

Usually, the intrinsic evidence resolves any ambiguity in a term’s meaning. When it does not, courts look to extrinsic evidence. *Vitronics*, 90 F.3d at 1583. Extrinsic evidence “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Phillips*, 415 F.3d at 1317 (internal quotation marks and citation omitted). Though these sources may be useful, “a court should discount any expert

testimony ‘that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history.’” *Id.* at 1318 (citation omitted).

Sometimes, neither intrinsic nor extrinsic evidence can resolve a term’s ambiguity. In those circumstances, the claim may be indefinite and thus invalid. *See* 35 U.S.C. § 112. “[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). Although the definiteness requirement mandates clarity, courts recognize that “absolute precision is unattainable.” *Id.* at 910. The level of certainty regarding a patent’s definiteness “is not greater than is reasonable,” considering the patent’s subject matter. *Id.* “[T]he party challenging the patent bears the burden of proving invalidity by clear and convincing evidence.” *Takeda Pharm. Co. v. Zydus Pharms. USA, Inc.*, 743 F.3d 1359, 1366 (Fed. Cir. 2014) (citing *Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. 91, 95 (2011)).

III. ANALYSIS

The lynchpin of Immersion’s argument is the doctrine of claim differentiation. The doctrine holds that “different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope.” *Seachange Int’l, Inc. v. C-COR, Inc.*, 413 F.3d 1361, 1368 (Fed. Cir. 2005) (citation and internal quotation marks omitted). Claim differentiation, however, “is not a hard and fast rule of construction.” *Id.* at 1369 (citation and internal quotation marks omitted). “The doctrine of claim differentiation can not broaden claims beyond their correct scope, determined in light of the specification and the prosecution history and any relevant extrinsic evidence. Claims that are written in different words may ultimately cover substantially the same subject matter.” *Id.* (cleaned up).

The Court does not construe the claim language in isolation. “Claim language must always be read in view of the written description, and any presumption created by the doctrine of claim differentiation ‘will be overcome by a contrary construction dictated by the written description or prosecution history.’” *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1305 (Fed. Cir. 2011) (citation omitted) (quoting *Seachange Int’l*, 413 F.3d at 1369). Finally, the presumption is “not as strong across related patents.” *Clare v. Chrysler Grp. LLC*, 819 F.3d 1323, 1330 (Fed. Cir. 2016).

Immersion relies too heavily on the presumption of claim differentiation. The intrinsic evidence overcomes the presumption that a “weir” and a “a weir having an overflow lip” mean different things. Moreover, because the intrinsic evidence resolves the dispute over the meaning of the two phrases, the Court need not consult extrinsic evidence. *See Vitronics*, 90 F.3d at 1583. In sum, Immersion has not provided clear and convincing evidence that the patents fail to inform “those skilled in the art about the scope of the invention.” *Nautilus*, 572 U.S. at 901; *see also Takeda Pharm.*, 743 F.3d at 1366.

A. The Claims

The parties’ stipulated claim terms resolve any ambiguity in the disputed terms. As already noted, the parties agree that a “weir” is “an overflow structure or barrier that determines the level of liquid.” Joint Claim Construction Chart 1, ECF No. 82-1. They also agree that “substantially uniform recovery” should be afforded its plain and ordinary meaning. *Id.* A person of ordinary skill in the art would understand that a weir, as “an overflow structure or barrier,” determines the level of a liquid by having an edge over which the liquid flows. The parties’ agreements therefore provide reasonable certainty as to the scope of the claim. *See Phillips*, 415 F.3d at 1312.

The question is whether adding the phrase “having an overflow lip” injects ambiguity into the claims. It does not. As Midas points out, the overflow lip is simply the bottom edge of the weir.

See Pl.’s Resp. Br. 8–9, ECF No. 80. The Court agrees that specifying that a weir has an overflow lip is redundant. And redundancies do not necessarily render a claim indefinite. For example, one court rejected an argument that the phrase “inner shell” used in one patent and the phrase “inner shell that is a rigid shell” used in a related patent must have different meanings. *Kranos IP Corp. v. Riddell, Inc.*, No. 17-C-6802, 2019 WL 1915366, at *2 (N.D. Ill. Apr. 24, 2019) (cleaned up). The Court reasoned that “the fact that a related patent contained different claim language has little probative value in light of the clear indications in the [other] patent that the inner shell must be rigid or hard.” *Id.* Likewise, that the later ’446 Patent omitted the phrase “having an overflow lip” is simply confirmation that the applicants recognized the redundancy. See *Shire LLC v. Abhai, LLC*, 219 F. Supp. 3d 241, 245 (D. Mass. 2016) (“Differently worded but similar claims in related patents, however, may still be construed identically where those patents share a specification and other technical details.”).

B. The Specification

The specification reinforces the plain meaning of the disputed terms. The ’457 Patent describes how the fluid flows into the reservoir: “One further shared component is the dielectric fluid recovery facility comprising a dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted smoothly to receive the dielectric fluid as it flows over the weir.” Def.’s App. 16, ECF No. 75 (references omitted). Figures 1, 5, and 6 show that the overflow lip is simply the bottom edge of the weir. *Id.* at 8, 10. The specification reinforces the conclusion that a “weir” and a “weir having an overflow lip” are precisely the same thing.

Immersion’s argument to the contrary misses the point. Immersion argues that “[n]owhere in the specification or claims is there any suggestion as to how the terms differ.” Def.’s Br. 17, ECF No. 74. But Midas’s position—and the plain language of the claims—is that the terms do *not* differ. Again, Immersion relies too heavily on claim differentiation in assuming that “weir” and

“weir having an overflow lip” must mean different things. The claims and specification demonstrate that the most reasonable interpretation is that “weir” and “weir having an overflow lip” are identical in meaning. *See Retractable Techs., Inc.*, 653 F.3d at 1305. Immersion does not rebut that reasonable interpretation.

C. The Prosecution History

The prosecution history resolves any remaining uncertainty about the meaning of the disputed terms. An examiner rejected the initial application for the '457 Patent because it was too similar to an already-patented air cooling system. *See* Def.'s App. 39–42, ECF No. 75. The applicants then added the phrase “having an overflow lip” to Claims 1 and 6 to clarify that the '457 Patent concerned liquid cooling, not air cooling. *Id.* at 45–48. The examiner again rejected the application, observing that “the ‘weir’ structure . . . merely amounts to an opening in a wall and its ‘lip’ is never defined as more than the bottom surface of that opening.” *Id.* at 88. So the applicants submitted another revised application, explaining in detail the difference between gas and liquid fluid dynamics. *Id.* at 100–01. After that final explanation, the examiner dropped the air cooling system as a prior-art reference and approved the '457 Patent. *See* Pl.'s Supp. App. 348–50, ECF No. 81.

The prosecution history confirms several points. First, stating that a weir has an overflow lip is redundant. As the examiner observed, the lip is merely “the bottom surface of [the weir's] opening.” Def.'s App. 88, ECF No. 75. Or, as Midas says, “All weirs have overflow lips.” Pl.'s Resp. Br. 8, ECF No. 80. Second, the '457 Patent applicants added the phrase “having an overflow lip” to underscore that the patent concerned a liquid cooling system rather than an air cooling system. As it turned out, adding the phrase did not help—the examiner required more explanation to distinguish the liquid and air cooling systems. Once the applicants provided that explanation, the patent was approved. Third, the omission of the phrase “having an overflow lip” from the

subsequent '446 Patent did not change the claims' meaning. The applicants for the '446 Patent simply acknowledged the examiner's conclusion that the phrase was redundant. They omitted the phrase because it added nothing to the description of a weir. The prosecution's history confirms that a person of ordinary skill in the art would understand the scope of the disputed phrases according to their plain meaning.

IV. CONCLUSION

The intrinsic evidence demonstrates that the disputed terms should be afforded their plain and ordinary meanings. The Court therefore need not consult any extrinsic evidence. *See Vitronics*, 90 F.3d at 1583. The Court also **DENIES** Immersion's invalidity claim because Immersion has not shown by clear and convincing evidence that the patents are indefinite. Accordingly, the Court **ORDERS** the following:

- 1) The Court construes the nineteen agreed-upon terms and phrases in the Joint Claim Construction Chart (ECF No. 82-1) in accordance with the parties' agreed constructions.
- 2) The Court construes the two disputed phrases (a) as not indefinite and (b) in accordance with their plain and ordinary meaning.
- 3) The Court refers the parties to the Amended Scheduling Order (ECF No. 64) regarding future litigation deadlines.

SO ORDERED this **22nd day of November 2021**.


Reed O'Connor
UNITED STATES DISTRICT JUDGE

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

Midas Green Technologies, LLC,

Plaintiff,

- vs. -

Rhodium Enterprises, Inc.;
Rhodium Technologies LLC;
Rhodium 10mw LLC;
Rhodium 2.0 LLC;
Rhodium 30mw LLC;
Rhodium Encore LLC;
Rhodium Industries LLC;
Rhodium JV LLC;
Rhodium Renewables LLC;
Rhodium Shared Services LLC;
Rhodium Shared Services PR Inc.;
Chase Blackmon;
Cameron Blackmon; and
Nathan Nichols,

Defendants.

Case No. 6:22-cv-00050-ADA

Jury Trial Demanded

JOINT STIPULATION ON CLAIM CONSTRUCTION

Pursuant to the Court’s Scheduling Order (Dkt. 47) the parties in the above-captioned case have exchanged their proposed claim terms and constructions. While Defendants Rhodium Enterprises, Inc., Rhodium Technologies LLC, Rhodium 10mw LLC, Rhodium 2.0 LLC, Rhodium 30mw LLC, Rhodium Encore LLC, Rhodium Industries LLC, Rhodium JV LLC, Rhodium Renewables LLC, Rhodium Shared Services LLC, Rhodium Shared Services PR Inc., Chase Blackmon, Cameron Blackmon, and Nathan Nichols (collectively, “Defendants”), do not believe that a construction of the terms listed below is necessary, to avoid further dispute and burden on the Court and parties, Defendants have agreed to the following constructions as proposed by Midas Green Technologies, LLC (“Midas”):

EXHIBIT

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| Term | Claim(s) | Agreed Construction |
|----------|-----------------------------------|--|
| “weir” | ’457 and ’446 patents, all claims | “an overflow structure or barrier that determines the level of liquid” |
| “plenum” | ’457 and ’446 patents, all claims | “a structure for dispensing liquid” |

The parties reserve the right to amend, modify, or supplement these proposed constructions as permitted by the Court and the Local and Federal Rules including, but not limited to, in light of further discovery, analysis, and investigation; review of newly or yet-to-be produced documents; or in the event the parties amend or supplements their infringement or invalidity contentions.

DATED: July 11, 2022

/s/ Henry Pogorzelski
Henry M. Pogorzelski
Texas Bar No. 24007852
Henry.Pogorzelski@klgates.com
K&L Gates LLP
2801 Via Fortuna, Suite #650
Austin, TX 78746
Tel. 512-482-6800
Fax. 512-482-6859

Nicholas F. Lenning (*admitted pro hac vice*)
K&L Gates LLP
925 Fourth Avenue, Suite 2900
Seattle, Washington 98104
nicholas.lenning@klgates.com
Telephone: (206) 370-6685
Fax: (206) 370-6006

ATTORNEYS FOR PLAINTIFF
MIDAS GREEN TECHNOLOGIES, LLC

Respectfully submitted,

/s/ Benjamin A. Herbert
Benjamin A. Herbert (*Admitted Pro Hac Vice*)
California State Bar No. 277356
KIRKLAND & ELLIS LLP
555 S. Flower St.
Los Angeles, CA 90071
Telephone: (213) 680-8400
Facsimile: (213) 680-8500
benjamin.herbert@kirkland.com

Gianni Cutri (*Admitted Pro Hac Vice*)
Illinois State Bar No. 6272109
KIRKLAND & ELLIS LLP
300 N. LaSalle
Chicago, IL 60654
Telephone: (312) 862-2000
Facsimile: (312) 862-2200
gianni.cutri@kirkland.com

Kat Li
State Bar No. 24070142
KIRKLAND & ELLIS LLP
401 Congress Avenue
Austin, TX 78701
Telephone: (512) 678-9100

Facsimile: (512) 678-9101
kat.li@kirkland.com

Attorneys for Defendants

Rhodium Enterprises, Inc., Rhodium Technologies LLC, Rhodium 10mw LLC, Rhodium 2.0 LLC, Rhodium 30mw LLC, Rhodium Encore LLC, Rhodium Industries LLC, Rhodium JV LLC, Rhodium Renewables LLC, Rhodium Shared Services LLC, Rhodium Shared Services PR Inc., Chase Blackmon, Cameron Blackmon, and Nathan Nichols

CERTIFICATE OF SERVICE

I hereby certify that counsel of record who have appeared electronically in this case are deemed to have consented to electronic service and are being served on July 11, 2022 with a copy of this document via the Court's CM/ECF system.

/s/ Benjamin A. Herbert
Benjamin A. Herbert

**UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

Midas Green Technologies, LLC,

Plaintiff,

- vs. -

Green Revolution Cooling, Inc.

Defendant

Civil Action No. 6:24-cv-00166-ADA

Jury Trial Demanded

PRELIMINARY INFRINGEMENT CONTENTIONS

Pursuant to the Court’s Standing Order Governing Proceedings (OGP) 4.4—Patent Cases, General Deadlines, paragraph 2, Plaintiff Midas Green Technologies, LLC (“Midas”) hereby serves these preliminary infringement contentions and related items.

1. Green Revolution Cooling, Inc. (“GRC”), by its making, having made, using and/or selling its ICeraQ10 and HashRaQ Max products (the “Accused Products”) infringes at least claims 1, 2, 3 and 6 of U.S. Patent No. 10,405,457 (the “’457 Patent”). Pursuant to 35 U.S.C. §271(a), GRC has directly infringed claims 1, 2, 3 and 6 of the ‘457 Patent. GRC has both past infringement and on-going infringement of the ‘457 Patent.
2. The ‘457 Patent was duly and legally issued on September 3, 2019 by the U.S. Patent and Trademark Office. The underlying application, U.S. Patent Application No. 14/355,533, was filed on April 30, 2014. The underlying PCT application was filed on December 13, 2013, which claims priority to US provisional application No. 61/737,200 (filed December 14, 2012) and to US provisional application No. 61/832,211 (filed June 7, 2013). The USPTO extended the term of the ‘457 Patent by 680 days.



3. A petition to correct inventorship for the '457 Patent is currently pending at the USPTO, which amends inventorship to indicate that Chris Boyd is the sole inventor of the '457 Patent claims. Chris Boyd conceived of the invention claimed in the '457 Patent at least as early as March 14, 2012, and Midas proceeded diligently to file US provisional application No. 61/832,211 on June 7, 2013. As the '457 Patent has an effective filing date of March 14, 2021, which is prior to March 16, 2013, Pre-AIA regarding 35 USC §102 applies.
4. Identify the priority date (i.e. the earliest date of invention) for each asserted claim: As presently understood, the priority date (earliest date of invention) for all asserted claims is at least as early as March 14, 2012, and all asserted claims are entitled to a priority date (effective filing date) of December 14, 2012.
5. Midas makes and sells products that practice the asserted claims of the '457 Patent. These products include at least the following products and models:

| Product | Description | Manufacturer or Provider |
|----------------|--|---------------------------------|
| XCIT4-50RM | 50U v4 Redundant | Midas |
| XCIC4-50C | 50U v4 Tier 0 | Midas |
| XCI4S-A-3 | 12U v4 Air Cooling Module 3kW | Midas |
| XCI4S-W-12 | 12U v4 Water Cooling Module 12kW | Midas |
| XCIC-480-400 | Self-Contained 400kW Compute Container designed for 480V input | Midas |
| SC2TV4-152 | ASIC Crypto Tank 2 Slot with 152kW Crypto Cooling Module | Midas |
| SC3TV4-152 | ASIC Crypto Tank 3 Slot with 152kW Crypto Cooling Module | Midas |
| SC3TV4FA-001 | Crypto Cooling Module | |

| Product | Description | Manufacturer or Provider |
|----------------------------|---|--------------------------|
| Acrylic sample Tank | Acrylic tank display unit for Whinstone. | Midas |
| MIDAS IMMERSION 2.0 | Universal Tank Configuration (Tank, SCCMS, Water Pump Skid, & Cooler) | Midas |
| S-GFD 090.1D/2x9-N21J/2P.M | 18 Fan Adiabatic Tower, Guentner | Guentner/Midas |
| ULV-LA209K5X-091E885 | 18 Fan Adiabatic Tower, Kelvion | Kelvion/Midas |

6. Preliminary infringement contentions charts setting forth where in the accused products each element of the asserted claim(s) is found: Please see attached Exhibit A for claim charts for both the ICeraQ10 and HashRaQ Max products.
7. GRC's infringement is willful, as it has known of the '457 Patent at least as early as the pendency of the *Midas Green Technologies, LLC v. Rhodium Enterprises, Inc. et al*, Case Number 6:22-cv-00050-ADA, filed in the Western District of Texas on May 29, 2020. GRC was a significant third-party witness in this matter. Discovery is likely to determine that GRC knew of the '457 patent earlier.
8. Production of documents evidencing conception and reduction to practice for each claimed invention: Please see MGT_GRC000001-000941, which is being produced separately.
9. Production of a copy of the file history for the '457 Patent. Please see MGT_GRC000001-928, which is being produced separately.

DATED: August 9, 2024

Respectfully submitted,

/s/ Joseph E. Thomas
Joseph E. Thomas (*admitted p.h.v*)
William J. Kolegraff (*admitted p.h.v*)
Grant J. Thomas (*admitted p.h.v*)
THOMAS WHITELAW & KOLEGRAFF LLP
18101 Von Karman Ave., Suite 230
Irvine, California 92612
Telephone: (949) 679-6400
Fax: (949) 679-6405
jthomas@twtlaw.com
bkolegraff@twtlaw.com
gthomas@twtlaw.com

Michael C. Smith
Texas Bar No. 18650410
michael.smith@solidcounsel.com
Scheef & Stone, LLP
113 E. Austin Street
Marshall, TX 75670
(903) 938-8900

Attorneys for Plaintiff Midas Green Technologies LLC

CERTIFICATE OF SERVICE

I hereby certify that counsel of record who have appeared electronically in this case are being served on August 9, 2024 with a copy of this document via email.


/s/ Tierra D. Mendiola


Tierra D. Mendiola


Exhibit A


Preliminary Infringement Contentions: '457 Patent Claim Chart

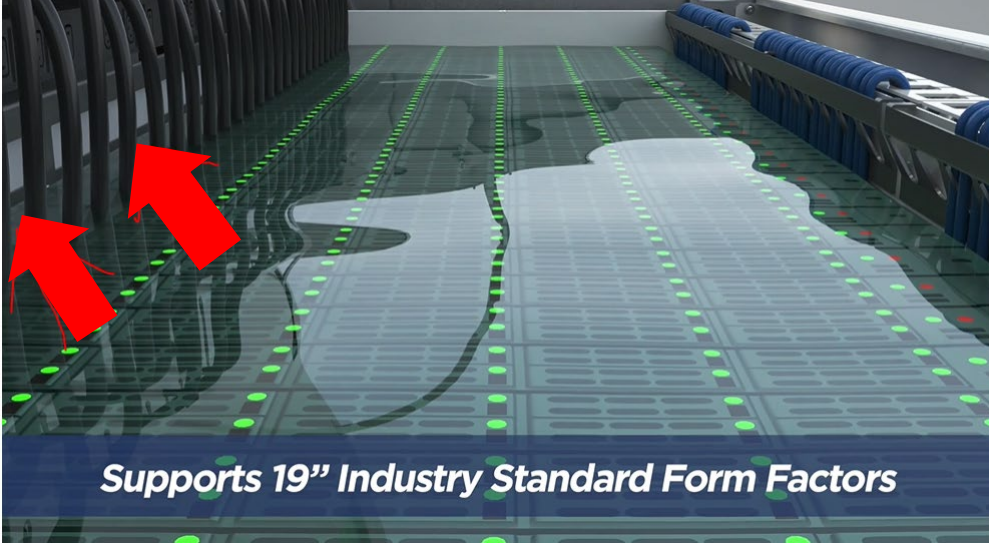
ICEraQ 10

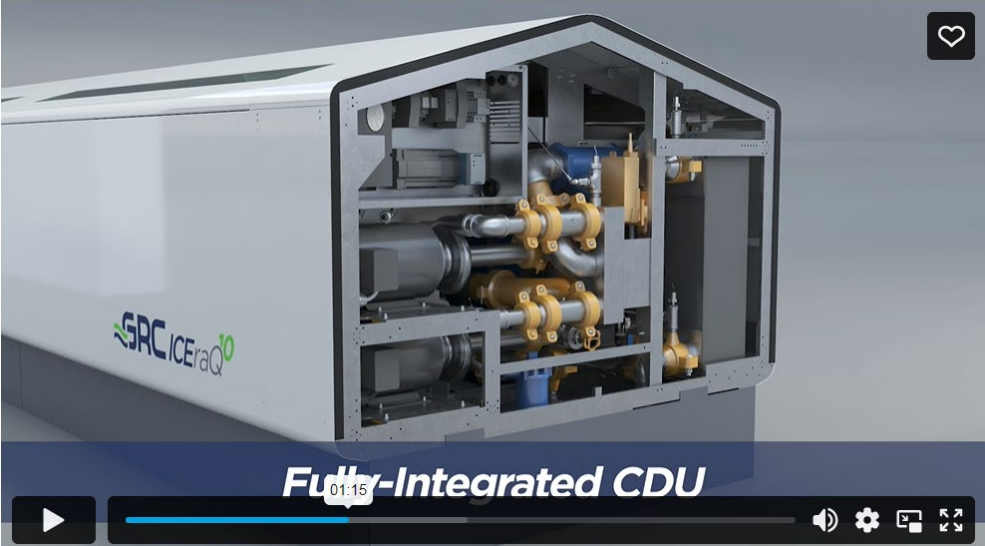
| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|--|
| <p>1. An Appliance immersion cooling system comprising:</p> | <p>To the extent the preamble is limiting, below is an image of the ICEraQ 10 which depicts an appliance immersion cooling system.</p> <p>If the preamble is limiting, then the ICEraQ directly infringes the preamble limitation.</p>  |
| <p>a. tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot</p> | <p>Below is an image of the ICEraQ Flex which depicts a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank. The ICEraQ Flex has a tank that holds multiple enterprise servers. Each server is set into an appliance slot, and each is fully immersed in a dielectric fluid.</p> <p>The ICEraQ directly infringes this limitation as the ICEraQ is a tank adapted to immerse servers, which by definition are electrical appliances, in</p> |


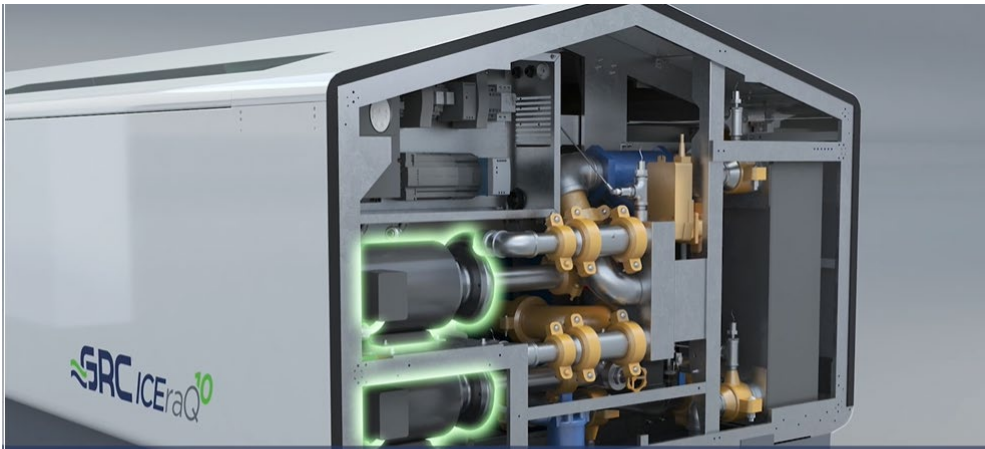
| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|---|
| <p>distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising:</p> | <p>dielectric fluid. The ICeraQ affixes these servers in a set of spaces (slots), which are oriented transverse to the long wall of the tank.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as computer servers are equivalent to an electrical appliance, and the servers are arranged and secured such that each sits in a space (slot) that allows fluid to flow between servers.</p>  |
| <p>i. A weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each</p> | <p>Below is an image from a video located Green Revolution Cooling, Inc.'s website found at URL https://www.grcooling.com/assets/seth-estrada-with-mineyour-biz-interviews-grcs-client-development-manager-neal-cox/ which depicts the weir located along the long wall of the tank. The weir is shown as the gray boxes on the left side of the image below. The gray boxes are mesh which allows the fluid to flow freely into the fluid recover reservoir, facilitating uniform recovery.</p> |


| Claim Element(s) | Where Found in Accused Instrumentalities |
|------------------|--|
| appliance slot. |  <p>Below is an image from a video located Green Revolution Cooling, Inc.'s website found at URL https://www.grcooling.com/learning-center/dcd-ny-2021-webinar/</p> <p>The weir in this image is on the right side of the image depicted by mesh boxes in the white wall on the right side of the liquid. This image depicts the weir located along the long wall of the tank:</p>  |


| Claim Element(s) | Where Found in Accused Instrumentalities |
|------------------|--|
| | <p data-bbox="443 283 1385 399">The image below is from the same source. This image is a close up of the image above. This image clearly depicts mesh in the wall which acts as a weir:</p>  <p data-bbox="443 1392 1419 1507">Further, the image below depicts the GRC ICERAQ 10 weir in action inside the tank in animated form. The picture is annotated by red arrows depicting the location of the weir.</p> |

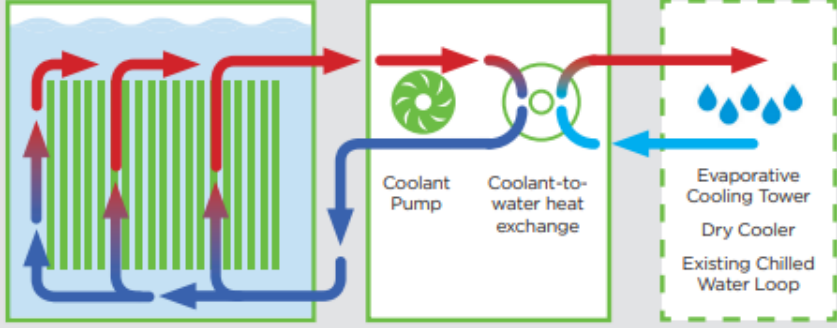
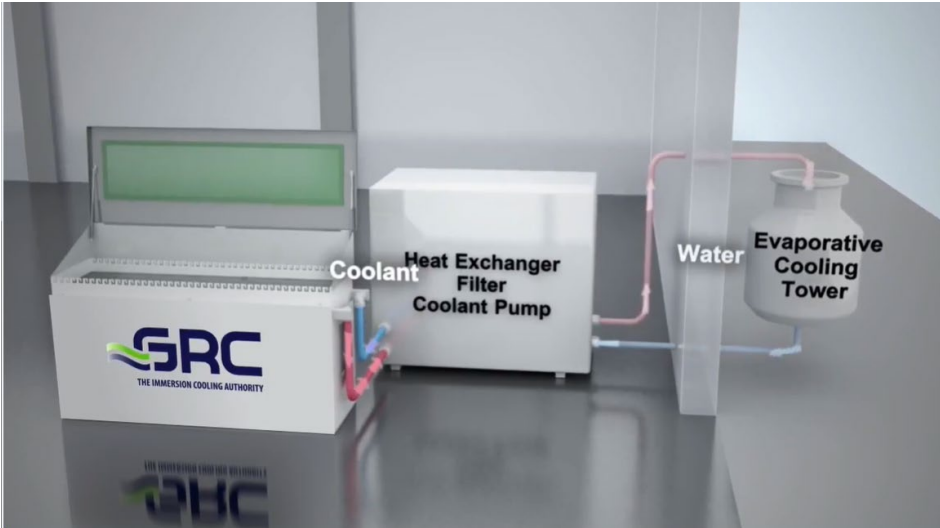
| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|---|
| |  <p>The ICEraQ directly infringes this limitation for the reasons identified above.</p> <p>Alternatively, the ICEraQ infringes this limitation under the doctrine of equivalents as the mesh described above is integrated into the long sidewall of the tank for the purpose of enabling dielectric fluid to pass through and fall by gravity into a receiving reservoir. In this way, the mesh acts as an overflow lip above a gravity fed dielectric fluid recovery reservoir. This has an equivalent function as the weir as claimed and operates by allowing warmer dielectric fluid to flow by gravity from the tank, thereby enabling removal of heat from the servers while keeping the servers fully immersed. The mesh has openings that act as an overflow lip to allow warmed fluid to uniformly flow from the tank into the reservoir.</p> |
| ii. A dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric | <p>A weir is a gravity fed structure that allows fluid to overflow a lip. The overflowing fluid must be received at a recovery reservoir for collection prior to the fluid being circulated by a pump. Because there is a gravity flow overflow weir in the GRC system, there will be a fluid recovery reservoir. The recovery reservoir must be located vertically beneath the overflow lip to collect the dielectric fluid.</p> <p>The ICEraQ directly infringes this limitation.</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|---|
| fluid over the weir. | Alternatively, the ICEraQ infringes this limitation under the doctrine of equivalents as the mesh described above is integrated into the long sidewall of the tank for enabling dielectric fluid to pass through and fall by gravity into a structure that is equivalent to a receiving reservoir. This has an equivalent function as the recovery reservoir as claimed and operates by receiving dielectric fluid by a gravity flow and allowing a pump to move fluid from the reservoir for cooling and then recirculation in the tank. |
| b. A primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising: | <p data-bbox="443 621 1203 695">Below is an image of a primary circulation facility found at https://www.grcooling.com/ICEraQ/</p>  <p data-bbox="443 1381 1143 1415">This system contains a high efficiency heat exchanger:</p> |


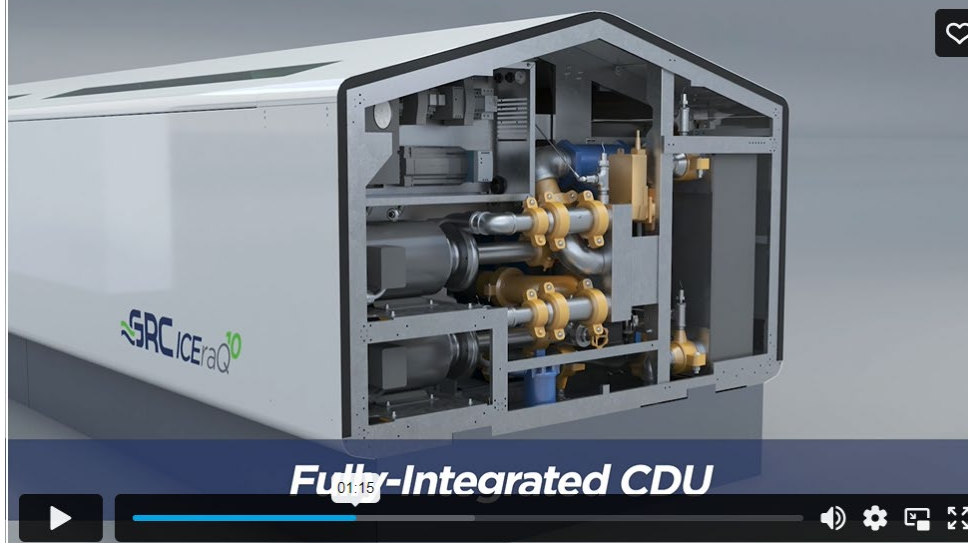
| Claim Element(s) | Where Found in Accused Instrumentalities |
|------------------|--|
| | <div data-bbox="451 333 1421 882"><p data-bbox="623 785 1256 835">High-Efficiency Heat Exchanger</p></div> <p data-bbox="443 926 1352 1003">Redundant variable-speed pumps. The pumps and associated plumbing circulate the dielectric fluid through the tank.</p> <div data-bbox="443 1005 1421 1562"><p data-bbox="591 1463 1289 1514">Redundant Variable-Speed Pumps</p></div> <p data-bbox="443 1604 756 1642">And intelligent controls:</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|---|
| |  <p>The ICeraQ directly infringes this limitation.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents because the ICeraQ contains a fully integrated coolant distribution unit or CDU. This CDU is fed by the pump(s) of the ICeraQ move heated fluid from the recovery reservoir for cooling in a heat exchanger, and then recirculate the cooled fluid back into the tank. These two systems are managed by the intelligent controls.</p> |
| <p>i. A plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upward through each appliance slot;</p> | <p>On information and belief, the ICeraQ contains a plenum which is adjacent to the bottom of the tank adapted to dispense the dielectric fluid substantially uniformly upward through each appliance slot. The plenum is depicted faintly. Holes can be seen in the image below on the bottom of the tank in a uniform line. Below is an image which depicts the potential presence of a plenum, as indicated by the red box annotated on the image:</p> |


| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|--|
| |  <p>The ICeraQ directly infringes this limitation.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as the structure is substantially at the bottom of the tank and is constructed to enable cooled fluid to flow upwardly through the servers, thereby allowing the servers to transfer heat to the rising fluid. The warmed fluid is then removed from the top of tank over the weir structure as previously described.</p> |
| <p>c. A secondary fluid circulation facility adapted to extract heat from the dielectric fluid circulation in the primary circulation facility, and dissipate to the environment the heat so extracted and</p> | <p>Below is an image of the operation of the ICeraQ which identifies a secondary fluid circulation system:</p> <p>The ICeraQ directly infringes this limitation.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as the ICeraQ moves heated fluid from the tank to a heat exchanger (equivalent to the primary circulation facility) where the fluid is cooled, and then the cooled fluid is recirculated to the tank. The heat exchanger moves heat from the fluid to another fluid (water or a water/glycol solution), which is moved to cooling towers, or other heat dispersion unit, to remove heat from the water or water/glycol solution, to the environment in which the cooling towers sit. This is equivalent to a secondary fluid circulation facility.</p> |


| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|--|
| | <p data-bbox="479 310 1385 359">How GRC Liquid Immersion Cooling Works</p>  <p data-bbox="557 825 1247 867">Heated coolant exits top of rack. Coolant returns to rack from heat exchanger at user-specified temperature.</p>  |
| d. a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the | <p data-bbox="443 1503 1401 1745">Below is an image identifying a control facility. The Control Facility is identified as a coolant distribution unit. Further the ICeraQ contains intelligent controls. These are depicted in an infographic depicting how the coolant distribution unit works to coordinate the operation of the primary and secondary circulation facilities a function of the dielectric fluid in the tank:</p> <p data-bbox="443 1797 1019 1829">The ICeraQ directly infringes this limitation.</p> |


| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|--|
| temperature of the dielectric fluid in the tank. | <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as the ICeraQ is designed to maintain the servers at a proper temperature, and uses electrically controlled coolant distribution unit, pumps and heat dispersion units to move dielectric fluid from the heat exchanger throughout the tank, and the water or water/glycol solution to the heat dispersion unit for cooling.</p> <div data-bbox="477 552 1390 1119"> <h3>How GRC Liquid Immersion Cooling Works</h3> <p>The diagram illustrates the GRC Liquid Immersion Cooling process. It shows three main components: 1. Open Data Center Server Racks Filled with Circulating Single-Phase Coolant, where red arrows indicate coolant rising and blue arrows indicate it returning. 2. Coolant Distribution Unit, containing a Coolant Pump and a Coolant-to-water heat exchanger. 3. Final Heat Rejection Options, which include an Evaporative Cooling Tower, a Dry Cooler, and an Existing Chilled Water Loop. Red arrows show the flow from the racks to the distribution unit and then to the heat rejection options. Blue arrows show the return flow from the heat rejection options back to the racks. A caption at the bottom states: 'Heated coolant exits top of rack. Coolant returns to rack from heat exchanger at user-specified temperature.'</p> </div> <div data-bbox="436 1192 1421 1738"> <p>A 3D cutaway rendering of the SRC ICeraQ Fully-Integrated CDU (Coolant Distribution Unit). The unit is a large, white, industrial-looking box with a cutaway section revealing internal components, including a pump, various pipes, and valves. The SRC logo and 'ICeraQ' are visible on the side. Below the rendering is a video player interface with a play button, a progress bar, and a timestamp of 01:15. The text 'Fully-Integrated CDU' is overlaid on the video player.</p> </div> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
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| |  |
| <p>2. The system of claim 1 wherein the tank and primary circulation facility comprise a highly-integrated module.</p> | <p>Below is an image of the ICeraQ identify that the primary circulation facility is comprised of a highly integrated module.</p>  <p>The ICeraQ directly infringes this limitation.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as the tank structure and the pumps and piping for the primary circulation facility are constructed withing the same housing structure, providing a standard solution that can be adapted for installation based on specific space parameters.</p> |

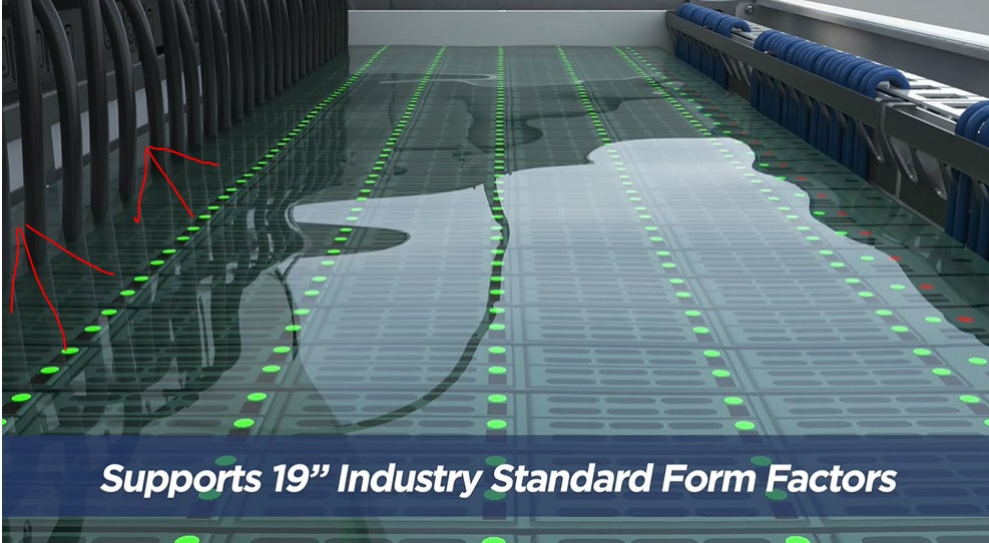
| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|--|
| <p>3. The system of claim 1 wherein the tank further comprises:</p> <p>a. An interconnected panel facility adapted to mount appliance support equipment.</p> | <p>Below is an image of the ICeraQ depicting an interconnected panel facility adapted to mount appliance support equipment.</p>   <p>The ICeraQ directly infringes this limitation.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as the ICeraQ has a structure positioned vertically above, or alternatively in parallel with the fluid level, that is used to coordinate the</p> |

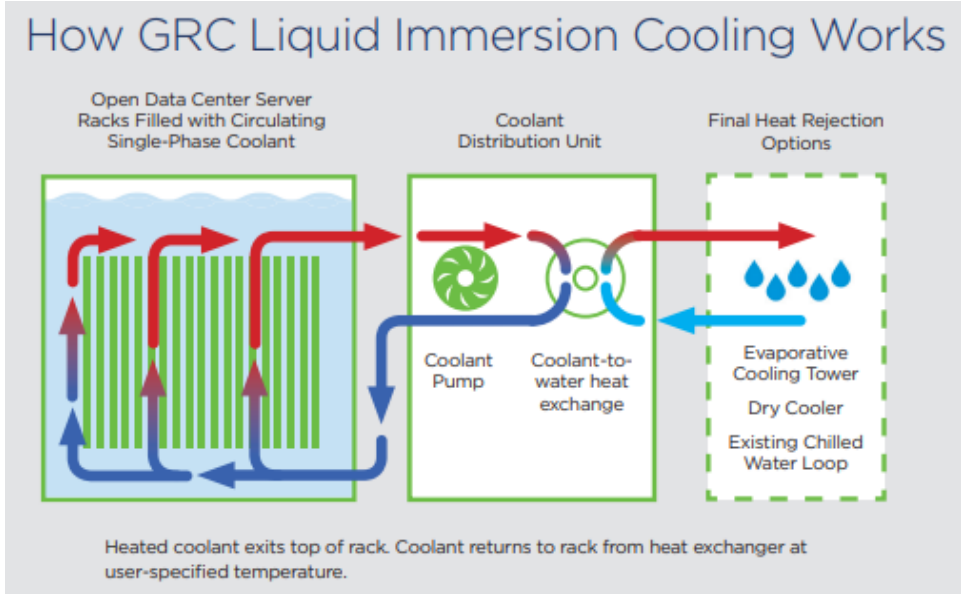
| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|---|
| | connection of cabling to the servers which serves the purpose of ease of accessibility and standardization of cable management |
| 6. A tank module adapted for use in an appliance immersion cooling system, the tank module comprising: | <p>The ICeraQ directly infringes this limitation as the ICeraQ is a tank module for use in an immersion cooling system. As can be seen above the tank is modular which allows for installation in sets.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as computer servers are equivalent to an electrical appliance, and the servers are arranged and secured such that each sits in a space (slot) that allows fluid to flow between servers.</p> |
| a. a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising: | <p>Below is an image of the ICeraQ Flex which depicts a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank. The ICeraQ Flex has a tank that holds multiple enterprise servers. Each server is set into an appliance slot, and each is fully immersed in a dielectric fluid.</p>  <p>The ICeraQ directly infringes this limitation as the ICeraQ is a tank adapted to immerse servers, which by definition are electrical appliances, in</p> |

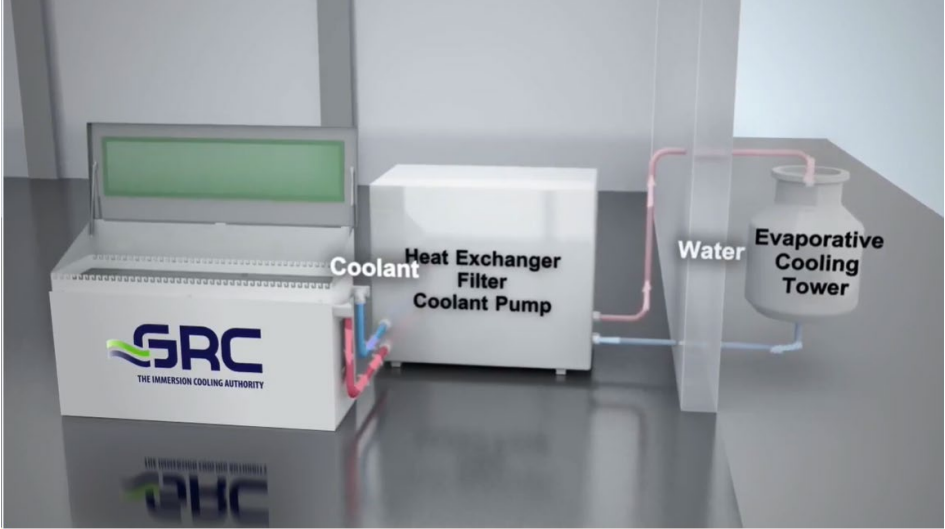
| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|---|
| | <p>dielectric fluid. The ICeraQ affixes these servers in a set of spaces (slots), which are oriented transverse to the long wall of the tank.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as computer servers are equivalent to an electrical appliance, and the servers are arranged and secured such that each sits in a space (slot) that allows fluid to flow between servers.</p> |
| <p>i. A weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot; and;</p> | <p>Below is an image from a video located Green Revolution Cooling, Inc.'s website found at URL https://www.grcooling.com/assets/seth-estrada-with-mineyour-biz-interviews-grcs-client-development-manager-neal-cox/ which depicts the weir located along the long wall of the tank. The weir is shown as the gray boxes on the left side of the image below. The gray boxes are mesh which allows the fluid to flow freely into the fluid recover reservoir.</p>  <p>Below is an image from a video located Green Revolution Cooling, Inc.'s website found at URL https://www.grcooling.com/learning-center/dcd-ny-2021-webinar/</p> <p>The weir in this image is on the right side of the image depicted by mesh boxes in the white wall on the right side of the liquid. This image depicts the weir located along the long wall of the tank:</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
|------------------|---|
| | <div data-bbox="451 321 1425 871"></div> <p data-bbox="451 913 1425 1035">The image below is from the same source. This image is a close up of the image above. This image clearly depicts mesh in the wall which acts as a weir:</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
|------------------|---|
| | <div data-bbox="462 336 1201 1222"></div> <p data-bbox="443 1262 1417 1377">Further, the image below depicts the GRC ICERAQ 10 weir in action inside the tank in animated form. The picture is annotated by red arrows depicting the location of the weir.</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|---|
| |  <p>The ICeraQ directly infringes this limitation for the reasons identified above.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as the mesh described above is integrated into the long sidewall of the tank for the purpose of enabling dielectric fluid to pass through and fall by gravity into a receiving reservoir. In this way, the mesh acts as an overflow lip above a gravity fed dielectric fluid recovery reservoir. This has an equivalent function as the weir as claimed and operates by allowing warmer dielectric fluid to flow by gravity from the tank, thereby enabling removal of heat from the servers while keeping the servers fully immersed. The mesh has openings that act as an overflow lip to allow warmed fluid to uniformly flow from the tank into the reservoir.</p> |
| <p>ii. A dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric</p> | <p>A weir is a gravity fed structure that allows fluid to overflow a lip. The overflowing fluid must be received at a recovery reservoir for collection prior to the fluid being circulated by a pump. Because there is a gravity flow overflow weir in the GRC system, there will be a fluid recovery reservoir. The recovery reservoir must be located vertically beneath the overflow lip to collect the dielectric fluid.</p> <p>The ICeraQ directly infringes this limitation.</p> |


| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|--|
| fluid as it flows over the weir; | <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as the mesh described above is integrated into the long sidewall of the tank for enabling dielectric fluid to pass through and fall by gravity into a structure that is equivalent to a receiving reservoir. This has an equivalent function as the recovery reservoir as claimed and operates by receiving dielectric fluid by a gravity flow and allowing a pump to move fluid from the reservoir for cooling and then recirculation in the tank.</p> |
| b. A primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising: | <p>Below is an infographic which depicts the primary circulation facility of the ICeraQ 10.</p>  <p>The ICeraQ directly infringes this limitation.</p> |

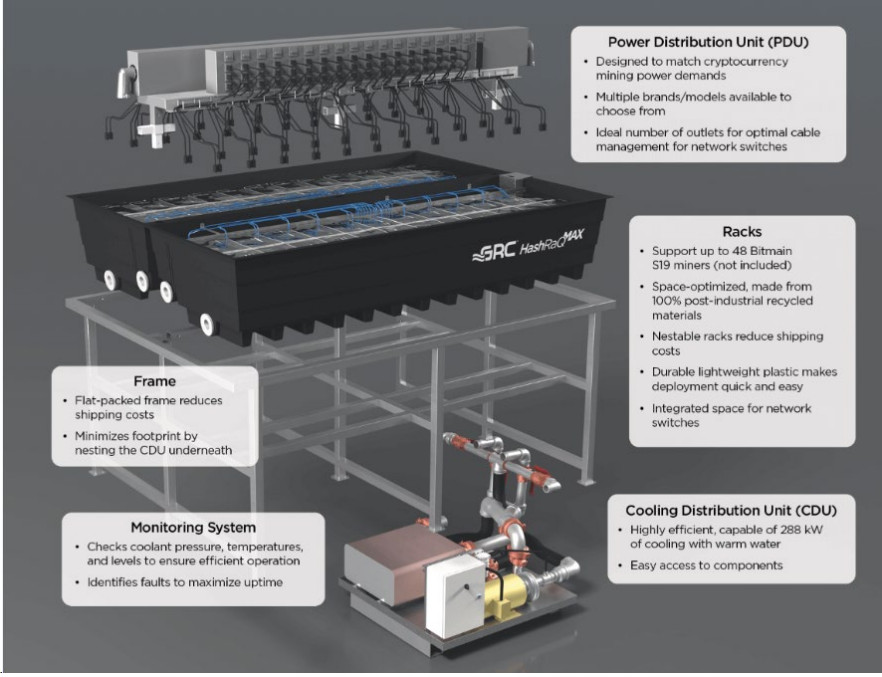
| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|---|
| | <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents because the ICeraQ contains a fully integrated coolant distribution unit or CDU. This CDU is fed by the pump(s) of the ICeraQ move heated fluid from the recovery reservoir for cooling in a heat exchanger, and then recirculate the cooled fluid back into the tank. These two systems are managed by the intelligent controls.</p>  |
| <p>i. A plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upward through each appliance slot; and</p> | <p>On information and belief, the ICeraQ contains a plenum which is adjacent to the bottom of the tank adapted to dispense the dielectric fluid substantially uniformly upward through each appliance slot. Below is an image which depicts the potential presence of a plenum. The ICeraQ directly infringes this limitation.</p> <p>Alternatively, the ICeraQ infringes this limitation under the doctrine of equivalents as the structure is substantially at the bottom of the tank and is constructed to enable cooled fluid to flow upwardly through the servers, thereby allowing the servers to transfer heat to the rising fluid. The warmed fluid is then removed from the top of tank over the weir structure as previously described.</p> |
| <p>c. A control facility adapted to control the operation of the primary</p> | <p>Below is an image identifying a control facility. The Control Facility is identified as a coolant distribution unit. Further the ICeraQ contains intelligent controls. These are depicted in an infographic depicting how the coolant distribution unit works to coordinate the operation of the primary</p> |

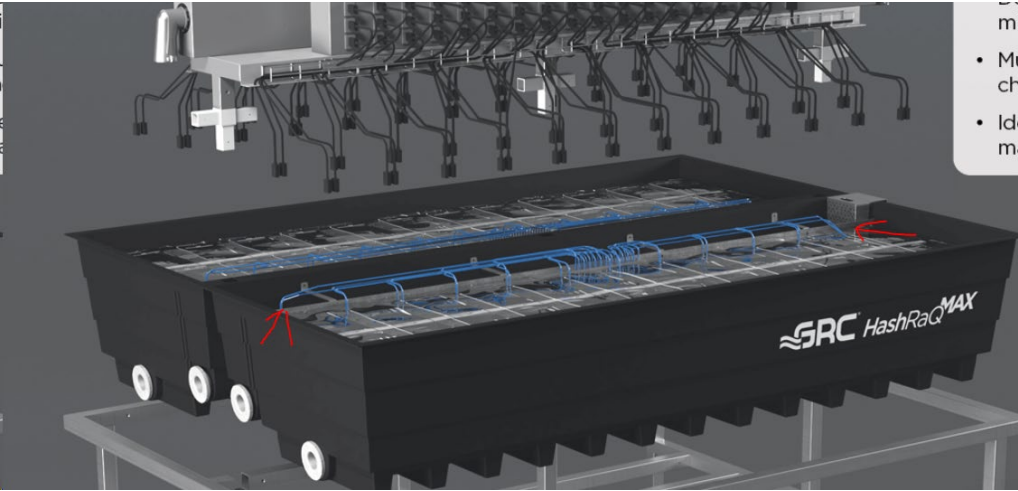
| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|--|
| <p>fluid circulation facility as a function of the temperature of the dielectric fluid in the tank.</p> | <p>and secondary circulation facilities a function of the dielectric fluid in the tank:</p> <p>The ICEraQ directly infringes this limitation.</p> <p>Alternatively, the ICEraQ infringes this limitation under the doctrine of equivalents as the ICEraQ is designed to maintain the servers at a proper temperature, and uses electrically controlled coolant distribution unit, pumps and heat dispersion units to move dielectric fluid from the heat exchanger throughout the tank, and the water or water/glycol solution to the</p> <div data-bbox="451 730 1377 1304"> <h3>How GRC Liquid Immersion Cooling Works</h3> <p>The diagram illustrates the GRC Liquid Immersion Cooling system. It consists of three main components: Open Data Center Server Racks, a Coolant Distribution Unit, and Final Heat Rejection Options. The server racks are filled with circulating single-phase coolant. Red arrows show the flow of heated coolant exiting the top of the racks and entering the Coolant Distribution Unit. Blue arrows show the flow of cooled coolant returning from the heat exchanger in the Coolant Distribution Unit back to the server racks. The Coolant Distribution Unit includes a Coolant Pump and a Coolant-to-water heat exchanger. The Final Heat Rejection Options include an Evaporative Cooling Tower, a Dry Cooler, and an Existing Chilled Water Loop.</p> <p>Open Data Center Server Racks Filled with Circulating Single-Phase Coolant</p> <p>Coolant Distribution Unit</p> <p>Final Heat Rejection Options</p> <p>Heated coolant exits top of rack. Coolant returns to rack from heat exchanger at user-specified temperature.</p> </div> <p>heat dispersion unit for cooling.</p> |

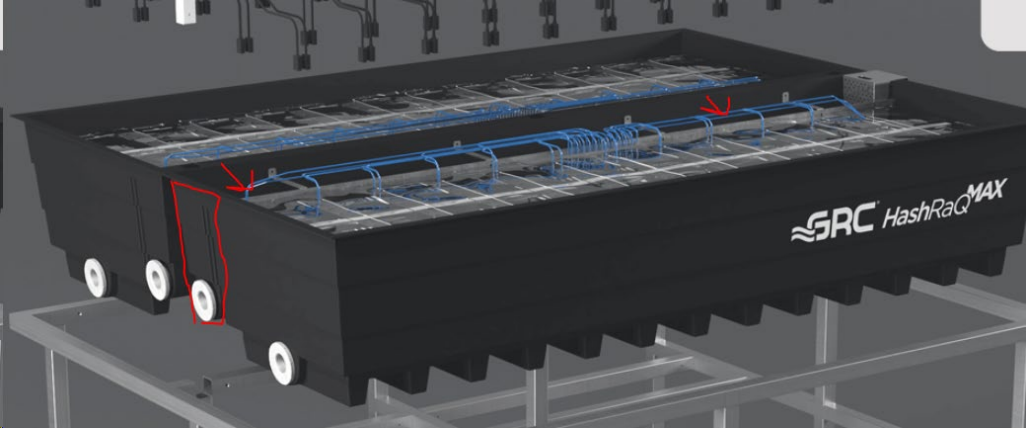
| Claim Element(s) | Where Found in Accused Instrumentalities |
|------------------|---|
| | <div><p>A 3D cutaway rendering of a white SRC ICEraQ10 container. The interior reveals a complex network of yellow pipes, valves, and a large horizontal cylindrical tank. The text "Fully-Integrated CDU" is overlaid in white on a dark blue banner at the bottom. A video player interface is visible at the bottom, showing a play button, a progress bar, and a timestamp of 01:15. A heart icon is in the top right corner.</p></div> <div><p>A 3D cutaway rendering of the same SRC ICEraQ10 container. A glowing green outline of a control panel or interface is superimposed on the internal components. The text "Intelligent Controls" is overlaid in white on a dark blue banner at the bottom.</p></div> |

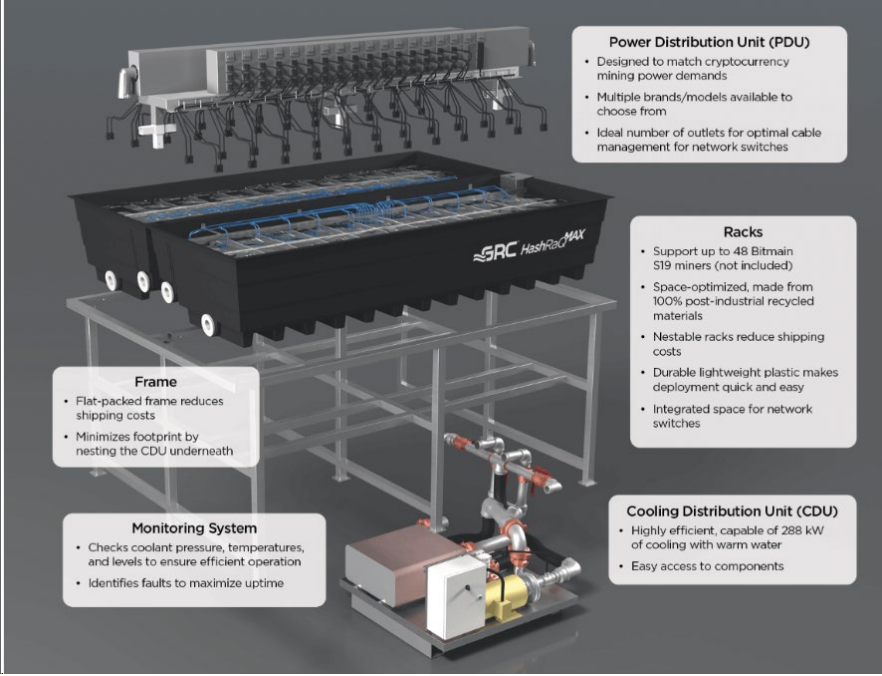
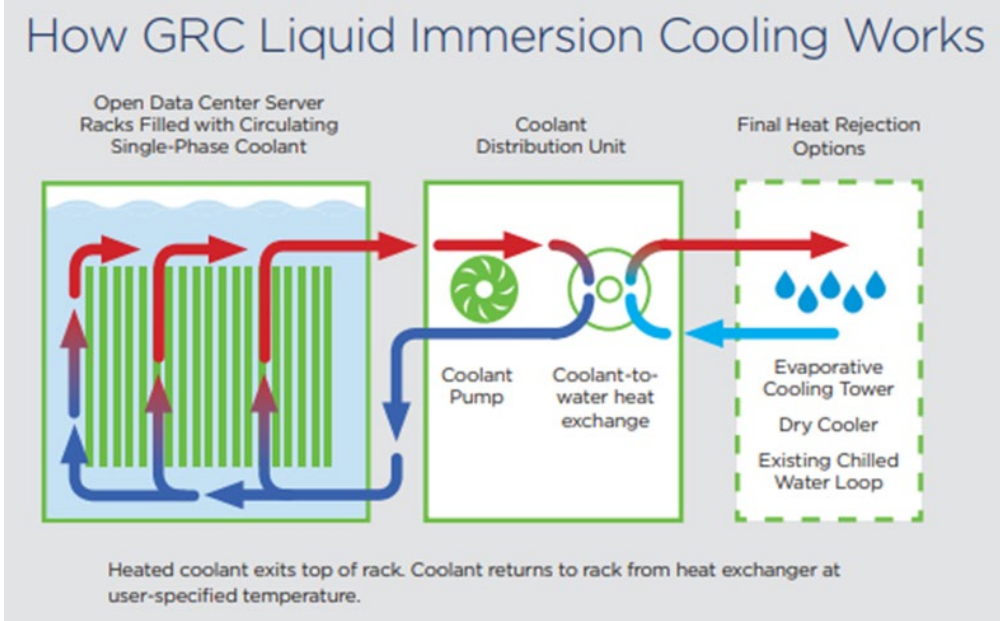
HashRaQ Max


| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|--|
| <p>1. An Appliance immersion cooling system comprising:</p> | <p>To the extent that the preamble is limiting, below is an image of the HashRaQ depicting a cooling system.</p>  <p>The HashRaQ Max directly infringes this limitation as the HashRaQ Max is a tank adapted to immerse Bitcoin mining computers, which by definition are electrical appliances, in dielectric fluid. The HashRaQ Max affixes these computers in a set of spaces (slots), which are oriented transverse to the long wall of the tank.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as Bitcoin mining computers are equivalent to an electrical appliance, and the computers are arranged and secured such that each sits in a space (slot) that allows fluid to flow between computers.</p> |
| <p>a. a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending</p> | <p>Below is an image of the HashRaQ which depicts a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank.</p> <p>The HashRaQ Max directly infringes this limitation as the HashRaQ Max is a tank adapted to immerse Bitcoin mining computers, which by definition are electrical appliances, in dielectric fluid. The HashRaQ Max affixes these computers in a set of spaces (slots), which are oriented transverse to the long wall of the tank.</p> |

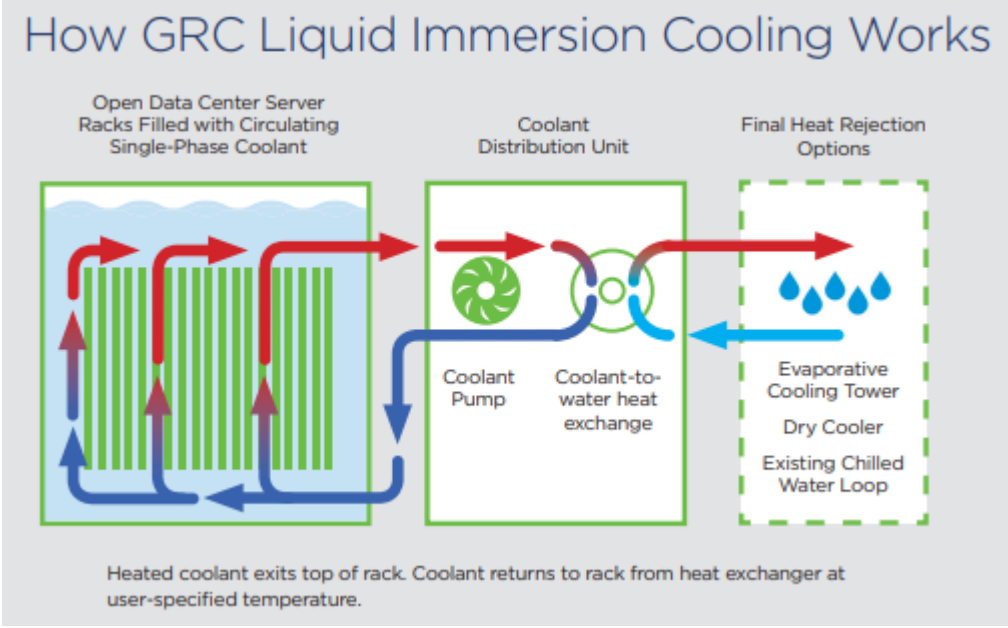
| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|---|
| transverse to, a long wall of the tank, the tank comprising: | <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as mining computers are equivalent to an electrical appliance, and the computers are arranged and secured such that each sits in a space (slot) that allows fluid to flow between computers.</p>  <p>Power Distribution Unit (PDU)</p> <ul style="list-style-type: none"> Designed to match cryptocurrency mining power demands Multiple brands/models available to choose from Ideal number of outlets for optimal cable management for network switches <p>Racks</p> <ul style="list-style-type: none"> Support up to 48 Bitmain S19 miners (not included) Space-optimized, made from 100% post-industrial recycled materials Nestable racks reduce shipping costs Durable lightweight plastic makes deployment quick and easy Integrated space for network switches <p>Frame</p> <ul style="list-style-type: none"> Flat-packed frame reduces shipping costs Minimizes footprint by nesting the CDU underneath <p>Monitoring System</p> <ul style="list-style-type: none"> Checks coolant pressure, temperatures, and levels to ensure efficient operation Identifies faults to maximize uptime <p>Cooling Distribution Unit (CDU)</p> <ul style="list-style-type: none"> Highly efficient, capable of 288 kW of cooling with warm water Easy access to components |
| i. A weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot. | <p>Below is an image of the HashRaQ depicting a weir located under the Power Dispersion Units along the center walls of the interior of the tank. This weir is adjacent to all appliance slots and adapted to allow for substantially uniform recovery of the dielectric fluid flowing through the appliance slots. The weir is indicated by red arrows and is a metal wall in the tank which separates the fluid from the overflow reservoir. This can be seen in the image below:</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
|------------------|---|
| |  <p>The HashRaQ Max directly infringes this limitation for the reasons identified above.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the mesh described above is integrated into the long sidewall of the tank for the purpose of enabling dielectric fluid to pass through and fall by gravity into a receiving reservoir. In this way, the mesh acts as an overflow lip above a gravity fed dielectric fluid recovery reservoir. This has an equivalent function as the weir as claimed and operates by allowing warmer dielectric fluid to flow by gravity from the tank, thereby enabling removal of heat from the computers while keeping the computers fully immersed. The mesh has openings that act as an overflow lip to allow warmed fluid to uniformly flow from the tank into the reservoir.</p> |



| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|--|
| <p>ii. A dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric fluid over the weir.</p> | <p>Below is an image of the HashRaQ depicting a fluid recovery reservoir which are depicted underneath the power distribution units and cable management system. The reservoir has pipes exiting the tank near the center of the unit. The fluid recovery</p>  <p>reservoir is indicated by a red rectangle and arrows in the image below:</p> <p>The HashRaQ Max directly infringes this limitation as described and shown above.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the mesh described above is integrated into the long sidewall of the tank for enabling dielectric fluid to pass through and fall by gravity into a structure that is equivalent to a receiving reservoir. This has an equivalent function as the recovery reservoir as claimed and operates by receiving dielectric fluid by a gravity flow and allowing a pump to move fluid from the reservoir for cooling and then recirculation in the tank.</p> |
| <p>b. A primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising:</p> | <p>Below is an image of the HashRaQ indicating that the image contains a cooling distribution unit, which circulates the hot fluid flowing form the tank through the cooling system, and then circulates the cool fluid back through the tank. This meets the claim limitation of a primary circulation facility.</p> <p>The HashRaQ Max directly infringes this limitation as described above.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents because the HashRaQ Max contains a fully integrated coolant distribution unit or CDU. This CDU is fed by the pump(s) of the HashRaQ Max move heated fluid from the recovery reservoir for cooling in a heat exchanger, and</p> |

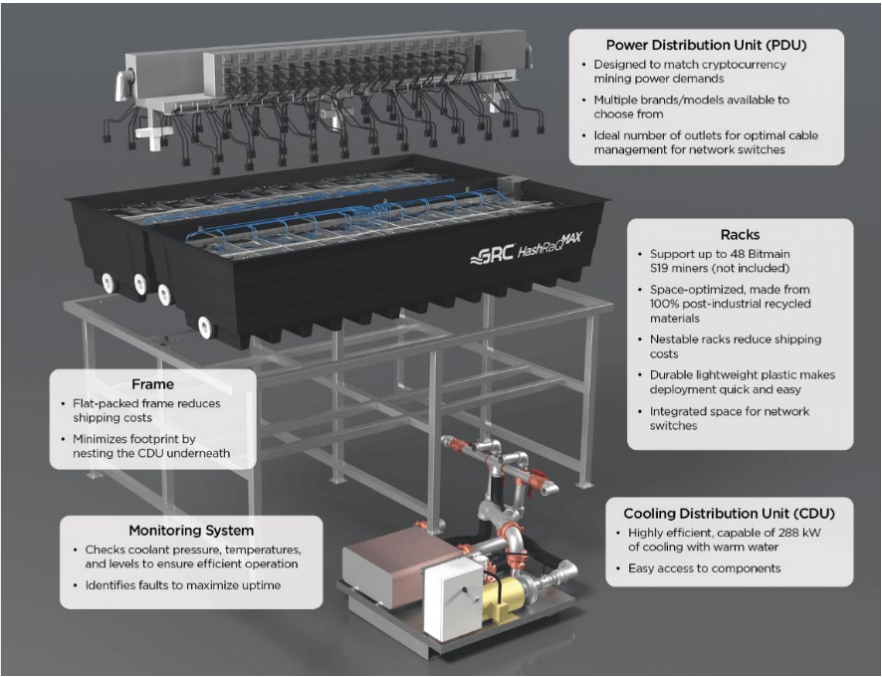

| Claim Element(s) | Where Found in Accused Instrumentalities |
|------------------|---|
| | <p>then recirculate the cooled fluid back into the tank. These two systems are managed by the intelligent controls.</p>  <p>Power Distribution Unit (PDU)</p> <ul style="list-style-type: none"> Designed to match cryptocurrency mining power demands Multiple brands/models available to choose from Ideal number of outlets for optimal cable management for network switches <p>Racks</p> <ul style="list-style-type: none"> Support up to 48 Bitcoin S19 miners (not included) Space-optimized, made from 100% post-industrial recycled materials Nestable racks reduce shipping costs Durable lightweight plastic makes deployment quick and easy Integrated space for network switches <p>Frame</p> <ul style="list-style-type: none"> Flat-packed frame reduces shipping costs Minimizes footprint by nesting the CDU underneath <p>Monitoring System</p> <ul style="list-style-type: none"> Checks coolant pressure, temperatures, and levels to ensure efficient operation Identifies faults to maximize uptime <p>Cooling Distribution Unit (CDU)</p> <ul style="list-style-type: none"> Highly efficient, capable of 288 kW of cooling with warm water Easy access to components <p>Below is an infographic that shows the operation of the cooling distribution unit.</p>  <p>How GRC Liquid Immersion Cooling Works</p> <p>Open Data Center Server Racks Filled with Circulating Single-Phase Coolant</p> <p>Coolant Distribution Unit</p> <p>Final Heat Rejection Options</p> <p>Heated coolant exits top of rack. Coolant returns to rack from heat exchanger at user-specified temperature.</p> |


| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|--|
| <p>i. A plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upward through each appliance slot; and</p> | <p>Below is an image of the HashRaQ which depicts a plenum positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upward through each appliance slot.</p>  <p>The HashRaQ Max directly infringes this limitation as described above.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the structure is substantially at the bottom of the tank and is</p> |

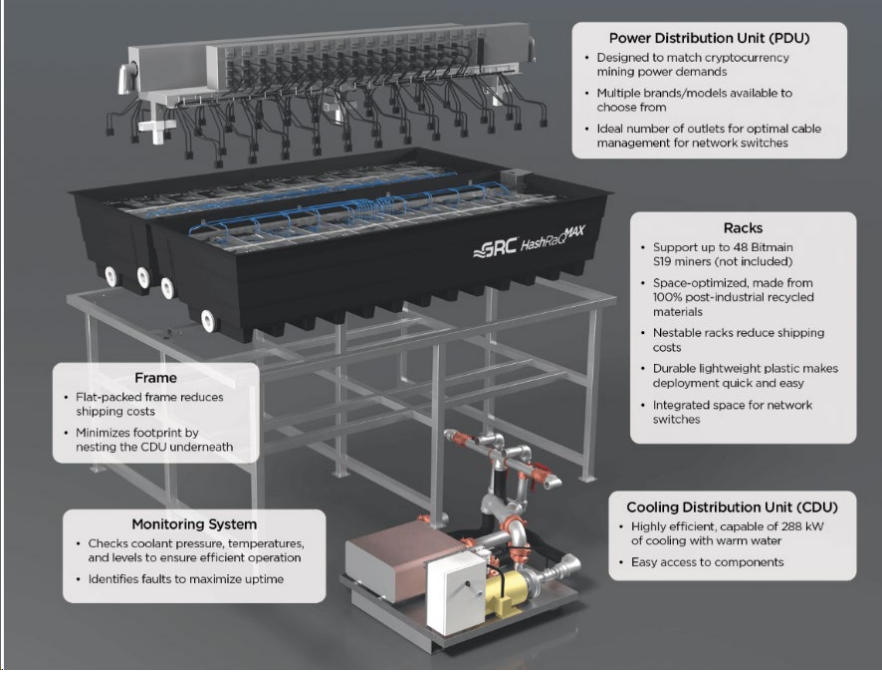
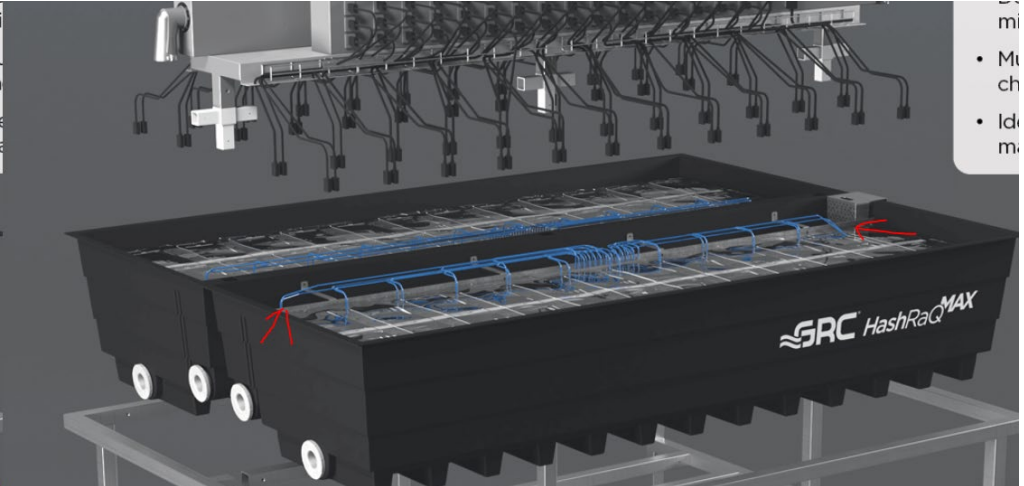
| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|---|
| | <p>constructed to enable cooled fluid to flow upwardly through the computers, thereby allowing the computers to transfer heat to the rising fluid. The warmed fluid is then removed from the top of tank over the weir structure as previously described.</p> |
| <p>c. A secondary fluid circulation facility adapted to extract heat from the dielectric fluid circulation in the primary circulation facility and dissipate to the environment the heat so extracted.</p> | <p>Below is an infographic which depicts the primary and secondary circulation facilities working in tandem. This image, on information and belief, applies to the application of the primary and secondary circulation facilities in the HashRaQ.</p> <p>The HashRaQ Max directly infringes this limitation as described below.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the HashRaQ Max moves heated fluid from the tank to a heat exchanger (equivalent to the primary circulation facility) where the fluid is cooled, and then the cooled fluid is recirculated to the tank. The heat exchanger moves heat from the fluid to another fluid (water or a water/glycol solution), which is moved to cooling towers, or other heat dispersion unit, to remove heat from the water or water/glycol solution, to the environment in which the cooling towers sit. This is equivalent to a secondary fluid circulation facility.</p>  |
| <p>d. A control facility adapted to control the</p> | <p>The HashRaQ has a Coolant Distribution Unit that operates as a control facility. This is confirmed below in a HashRaQ Max information sheet under monitoring and reporting. This information sheet details a control system adapted to control the</p> |

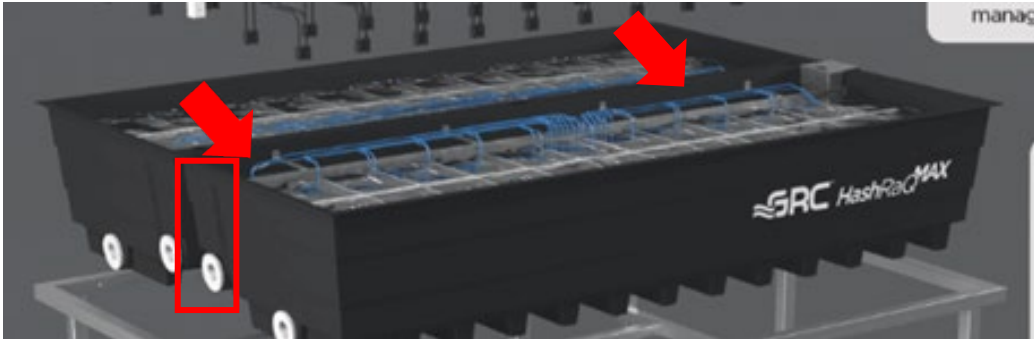
| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|--|
| <p>operation of the primary fluid circulation facility as a function of the temperature of the dielectric fluid in the tank.</p> | <p>operation of the primary and secondary circulation facilities as a function of the temperature of the dielectric fluid in the tank.</p> <p>The HashRaQ Max directly infringes this limitation as described herein.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the HashRaQ Max is designed to maintain the computers at a proper temperature, and uses electrically controlled coolant distribution unit, pumps and heat dispersion units to move dielectric fluid from the heat exchanger throughout the tank, and the water or water/glycol solution to the heat dispersion unit for cooling.</p> <div data-bbox="483 716 1474 1331"> <h3>How GRC Liquid Immersion Cooling Works</h3> <p>The diagram illustrates the GRC Liquid Immersion Cooling system. It shows three main components: Open Data Center Server Racks, a Coolant Distribution Unit, and Final Heat Rejection Options. The server racks are filled with circulating single-phase coolant. Red arrows indicate the flow of heated coolant exiting the top of the racks. Blue arrows show the coolant returning to the racks from the heat exchanger. The Coolant Distribution Unit contains a Coolant Pump and a Coolant-to-water heat exchanger. The Final Heat Rejection Options include an Evaporative Cooling Tower, a Dry Cooler, and an Existing Chilled Water Loop.</p> <p>Open Data Center Server Racks Filled with Circulating Single-Phase Coolant</p> <p>Coolant Distribution Unit</p> <p>Final Heat Rejection Options</p> <p>Heated coolant exits top of rack. Coolant returns to rack from heat exchanger at user-specified temperature.</p> </div> |

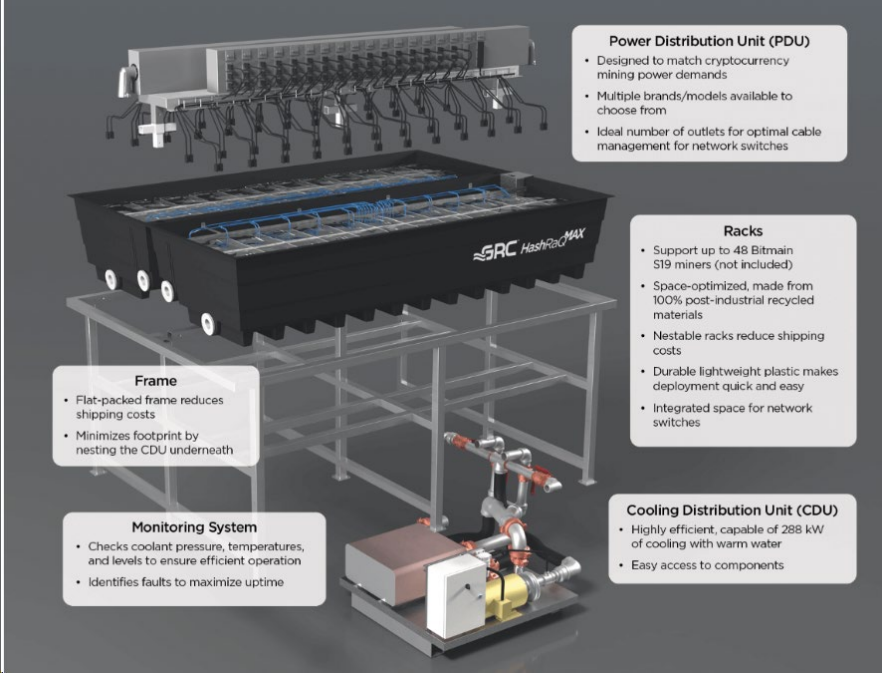
| Claim Element(s) | Where Found in Accused Instrumentalities | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|----------------------------------|---|----------------------|-----------------------|--|--|------------------------|--|----------------------------------|---------------------|--------------------------|-------------------------|-------------------|-------|----------------------|--|----------|------|---------|-------------|--------------|-------|----------------------|-----------|--------------------------|--|--------------------------------|---|-----------------------------|--|-----------------------|------------------|---------|-------------------|---|--------------------|------------------------------|---|--------------------|---|------------------------|---|------------------------|-----------------------------------|----------|--|----------|--------------------------|--------------------------------|--------|----------------------------------|---|--|------------------|--|----------------|-----------------|---|-----------------------|---|-----------|--|----------------|----------|---|---------------------------|--|--|
| | <div data-bbox="475 310 1396 436">  </div> <div data-bbox="475 468 747 489">General Product Specifications</div> <table border="1" data-bbox="475 495 927 900"> <tr><td>Number of Immersion-Cooled Racks</td><td>2</td></tr> <tr><td>Total Miner Capacity</td><td>48 Bitcoin S19 miners</td></tr> <tr><td>Number of CDUs per Double-Capacity Rack 1²</td><td></td></tr> <tr><td>Total Cooling Capacity</td><td></td></tr> <tr><td>Chiller-Free Water: 40°C (104°F)</td><td>288 kW⁴</td></tr> <tr><td>Over-Clocking Capability</td><td>6 kW/miner⁵</td></tr> <tr><td>pPUE⁶</td><td><1.02</td></tr> <tr><td colspan="2">Standard PDU Details</td></tr> <tr><td>Quantity</td><td>Four</td></tr> <tr><td>Outlets</td><td>24 C19 each</td></tr> <tr><td>Architecture</td><td>Basic</td></tr> <tr><td>Circuit Breaker Amps</td><td>160A each</td></tr> <tr><td colspan="2">Alternate PDUs Available</td></tr> <tr><td>Overall Dimensions (L x W x H)</td><td>2.85 m x 1.97 m x 1.55 m (9.4 ft x 6.5 ft x 5.1 ft)</td></tr> <tr><td colspan="2">Estimated Component Weights</td></tr> <tr><td>Racks, CDU, and Stand</td><td>227 kg (500 lbs)</td></tr> <tr><td>Coolant</td><td>860 kg (1894 lbs)</td></tr> <tr><td>Estimated Weight When Commissioned⁷</td><td>1950 kg (4300 lbs)</td></tr> </table> <div data-bbox="475 919 633 940">Power and Water</div> <table border="1" data-bbox="475 947 927 1276"> <tr><td>Final Heat Rejection Options</td><td>Flexible options can include: Adiabatic/evaporative cooling tower Dry cooler⁸</td></tr> <tr><td>Water Requirements</td><td>Maximum particulate size 0.8 mm⁹ Input temperature 40°C (104°F) Recirculating flow 29.5 m³/hr (130 gpm) 6 to 9°C dT (10 to 15°F dT) Connection 73.0 mm (2.5") male Victaulic</td></tr> <tr><td>CDU Power Requirements</td><td>1x 3PH 460VAC 60Hz, max power consumption 3.7kW</td></tr> <tr><td>PDU Power Requirements</td><td>4x 160A 415Y/240VAC¹⁰</td></tr> </table> <div data-bbox="954 468 1170 489">Monitoring and Reporting</div> <table border="1" data-bbox="954 495 1396 638"> <tr><td>Platform</td><td>IoT with Modbus TCP/IP for BMS interface</td></tr> <tr><td>Alerting</td><td>Alerts via DCIM platform</td></tr> <tr><td>DCIM/BMS Integration Protocols</td><td>Modbus</td></tr> <tr><td>Measurements and Fault Detection</td><td>Operating temperatures of coolant and water</td></tr> <tr><td></td><td>Coolant pressure</td></tr> <tr><td></td><td>Coolant levels</td></tr> </table> <div data-bbox="954 657 1105 678">Site Requirements</div> <table border="1" data-bbox="954 684 1396 835"> <tr><td>Client provides</td><td>Access to power and recirculating water¹¹ Secondary containment Level surface (slab or raised floor) with slope <1/650 Standard data center fire suppression as required</td></tr> <tr><td>Operating Environment</td><td>Ambient temperature 5 to 45°C (40 to 113°F)</td></tr> </table> <div data-bbox="954 854 1157 875">Delivery and Installation</div> <table border="1" data-bbox="954 882 1396 961"> <tr><td>Lead Time</td><td>Typically ships within 12 weeks after receipt of purchase order.</td></tr> <tr><td>Shipping Terms</td><td>Ex-Works</td></tr> <tr><td>On-site Installation and Training¹²</td><td>One business day per unit</td></tr> </table> <div data-bbox="954 980 1032 1001">Warranty</div> <table border="1" data-bbox="954 1008 1396 1087"> <tr><td>Includes 90-day limited warranty against defects in material and workmanship with limited support. Annual monitoring plans</td><td>Other plans available for additional cost: Full year limited warranties and support plans Annual maintenance plans</td></tr> </table> <div data-bbox="954 1106 1424 1255"> <p>¹ An additional spare CDU available for additional cost.</p> <p>² CDU is designed for up to 288 kW (6 kW per miner). Actual cooling capacity will depend on end user's specified level of over-clocking, as well as final heat rejection system.</p> <p>³ Over-clocking greater than 6 kW/miner may require colder/chilled water.</p> <p>⁴ General specification assuming 6 kW/miner. Values will change if end user utilizes less over-clocking.</p> <p>⁵ Includes coolant, mining equipment, cables, and cords. Actual weight depends on configuration.</p> <p>⁶ System cooling performance dependent on climate.</p> <p>⁷ Failures resulting from particulates exceeding 0.8mm or poor water quality will void warranty.</p> <p>⁸ One input power feed per PDU.</p> <p>⁹ GRC and HTS can assist in heat rejection design/implementation.</p> <p>¹⁰ Installation applies to installing the rack in the data center space only and does not include installation of digital asset mining equipment.</p> </div> <div data-bbox="1182 1291 1396 1375">  </div> | Number of Immersion-Cooled Racks | 2 | Total Miner Capacity | 48 Bitcoin S19 miners | Number of CDUs per Double-Capacity Rack 1 ² | | Total Cooling Capacity | | Chiller-Free Water: 40°C (104°F) | 288 kW ⁴ | Over-Clocking Capability | 6 kW/miner ⁵ | pPUE ⁶ | <1.02 | Standard PDU Details | | Quantity | Four | Outlets | 24 C19 each | Architecture | Basic | Circuit Breaker Amps | 160A each | Alternate PDUs Available | | Overall Dimensions (L x W x H) | 2.85 m x 1.97 m x 1.55 m (9.4 ft x 6.5 ft x 5.1 ft) | Estimated Component Weights | | Racks, CDU, and Stand | 227 kg (500 lbs) | Coolant | 860 kg (1894 lbs) | Estimated Weight When Commissioned ⁷ | 1950 kg (4300 lbs) | Final Heat Rejection Options | Flexible options can include: Adiabatic/evaporative cooling tower Dry cooler ⁸ | Water Requirements | Maximum particulate size 0.8 mm ⁹ Input temperature 40°C (104°F) Recirculating flow 29.5 m ³ /hr (130 gpm) 6 to 9°C dT (10 to 15°F dT) Connection 73.0 mm (2.5") male Victaulic | CDU Power Requirements | 1x 3PH 460VAC 60Hz, max power consumption 3.7kW | PDU Power Requirements | 4x 160A 415Y/240VAC ¹⁰ | Platform | IoT with Modbus TCP/IP for BMS interface | Alerting | Alerts via DCIM platform | DCIM/BMS Integration Protocols | Modbus | Measurements and Fault Detection | Operating temperatures of coolant and water | | Coolant pressure | | Coolant levels | Client provides | Access to power and recirculating water ¹¹ Secondary containment Level surface (slab or raised floor) with slope <1/650 Standard data center fire suppression as required | Operating Environment | Ambient temperature 5 to 45°C (40 to 113°F) | Lead Time | Typically ships within 12 weeks after receipt of purchase order. | Shipping Terms | Ex-Works | On-site Installation and Training ¹² | One business day per unit | Includes 90-day limited warranty against defects in material and workmanship with limited support. Annual monitoring plans | Other plans available for additional cost: Full year limited warranties and support plans Annual maintenance plans |
| Number of Immersion-Cooled Racks | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Miner Capacity | 48 Bitcoin S19 miners | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of CDUs per Double-Capacity Rack 1 ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Cooling Capacity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chiller-Free Water: 40°C (104°F) | 288 kW ⁴ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Over-Clocking Capability | 6 kW/miner ⁵ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pPUE ⁶ | <1.02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard PDU Details | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Quantity | Four | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outlets | 24 C19 each | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Architecture | Basic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Circuit Breaker Amps | 160A each | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alternate PDUs Available | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Overall Dimensions (L x W x H) | 2.85 m x 1.97 m x 1.55 m (9.4 ft x 6.5 ft x 5.1 ft) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Estimated Component Weights | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Racks, CDU, and Stand | 227 kg (500 lbs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Coolant | 860 kg (1894 lbs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Estimated Weight When Commissioned ⁷ | 1950 kg (4300 lbs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Final Heat Rejection Options | Flexible options can include: Adiabatic/evaporative cooling tower Dry cooler ⁸ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water Requirements | Maximum particulate size 0.8 mm ⁹ Input temperature 40°C (104°F) Recirculating flow 29.5 m ³ /hr (130 gpm) 6 to 9°C dT (10 to 15°F dT) Connection 73.0 mm (2.5") male Victaulic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CDU Power Requirements | 1x 3PH 460VAC 60Hz, max power consumption 3.7kW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PDU Power Requirements | 4x 160A 415Y/240VAC ¹⁰ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Platform | IoT with Modbus TCP/IP for BMS interface | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alerting | Alerts via DCIM platform | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCIM/BMS Integration Protocols | Modbus | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements and Fault Detection | Operating temperatures of coolant and water | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Coolant pressure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Coolant levels | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client provides | Access to power and recirculating water ¹¹ Secondary containment Level surface (slab or raised floor) with slope <1/650 Standard data center fire suppression as required | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Environment | Ambient temperature 5 to 45°C (40 to 113°F) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead Time | Typically ships within 12 weeks after receipt of purchase order. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shipping Terms | Ex-Works | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| On-site Installation and Training ¹² | One business day per unit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Includes 90-day limited warranty against defects in material and workmanship with limited support. Annual monitoring plans | Other plans available for additional cost: Full year limited warranties and support plans Annual maintenance plans | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. The system of claim 1 wherein the tank and primary circulation facility comprise a highly-integrated module. | <p data-bbox="443 1440 1380 1472">Below is an image of the HashRaQ depicting a highly integrated module.</p> <p data-bbox="443 1520 1365 1551">The HashRaQ Max directly infringes this limitation as described herein.</p> <p data-bbox="443 1600 1539 1766">Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the tank structure and the pumps and piping for the primary circulation facility are constructed withing the same housing structure, providing a standard solution that can be adapted for installation based on specific space parameters.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

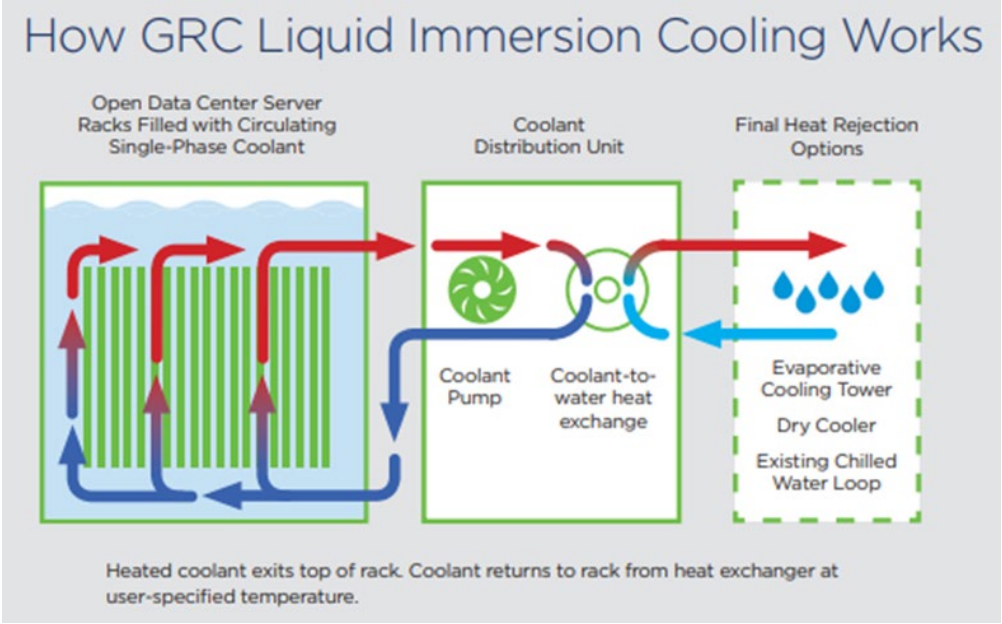
| Claim Element(s) | Where Found in Accused Instrumentalities |
|--|---|
| |  <p>Power Distribution Unit (PDU)</p> <ul style="list-style-type: none"> Designed to match cryptocurrency mining power demands Multiple brands/models available to choose from Ideal number of outlets for optimal cable management for network switches <p>Racks</p> <ul style="list-style-type: none"> Support up to 48 Bitmain S19 miners (not included) Space-optimized, made from 100% post-industrial recycled materials Nestable racks reduce shipping costs Durable lightweight plastic makes deployment quick and easy Integrated space for network switches <p>Frame</p> <ul style="list-style-type: none"> Flat-packed frame reduces shipping costs Minimizes footprint by nesting the CDU underneath <p>Monitoring System</p> <ul style="list-style-type: none"> Checks coolant pressure, temperatures, and levels to ensure efficient operation Identifies faults to maximize uptime <p>Cooling Distribution Unit (CDU)</p> <ul style="list-style-type: none"> Highly efficient, capable of 288 kW of cooling with warm water Easy access to components |
| <p>3. The system of claim 1 wherein the tank further comprises:</p> <p>a. An interconnected panel facility adapted to mount appliance support equipment.</p> | <p>Below is an image of the ICEraQ depicting an interconnected panel facility adapted to mount appliance support equipment.</p>  <p>The HashRaQ Max directly infringes this limitation as described herein.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the HashRaQ Max has a structure positioned vertically above, or alternatively in parallel with the fluid level, that is used to coordinate the connection</p> |


| Claim Element(s) | Where Found in Accused Instrumentalities |
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| | of cabling to the computers, which serves the purpose of ease of accessibility and standardization of cable management |
| <p>6. A tank module adapted for use in an appliance immersion cooling system, the tank module comprising:</p> | <p>To the extent that the preamble is limiting, below is an image of the HashRaQ depicting a cooling system.</p>  <p>The HashRaQ Max directly infringes this limitation as the HashRaQ Max is a tank module for use in an immersion cooling system. As can be seen above the tank is modular which allows for installation in sets.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as Bitcoin mining computers are equivalent to an electrical appliance, and the computers are arranged and secured such that each sits in a space (slot) that allows fluid to flow between computers.</p> |
| <p>a. a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank</p> | <p>Below is an image of the HashRaQ which depicts a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank.</p> <p>The HashRaQ Max directly infringes this limitation as the HashRaQ Max is a tank adapted to Bitcoin mining computers, which by definition are electrical appliances, in dielectric fluid. The HashRaQ Max affixes these computers in a set of spaces (slots), which are oriented transverse to the long wall of the tank.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as computers are equivalent to an electrical appliance, and the computers</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
|---|---|
| long wall of the tank, the tank comprising: | <p>are arranged and secured such that each sits in a space (slot) that allows fluid to flow between computers.</p>  <p>Power Distribution Unit (PDU)</p> <ul style="list-style-type: none"> Designed to match cryptocurrency mining power demands Multiple brands/models available to choose from Ideal number of outlets for optimal cable management for network switches <p>Racks</p> <ul style="list-style-type: none"> Support up to 48 Bitcoin S19 miners (not included) Space-optimized, made from 100% post-industrial recycled materials Nestable racks reduce shipping costs Durable lightweight plastic makes deployment quick and easy Integrated space for network switches <p>Frame</p> <ul style="list-style-type: none"> Flat-packed frame reduces shipping costs Minimizes footprint by nesting the CDU underneath <p>Monitoring System</p> <ul style="list-style-type: none"> Checks coolant pressure, temperatures, and levels to ensure efficient operation Identifies faults to maximize uptime <p>Cooling Distribution Unit (CDU)</p> <ul style="list-style-type: none"> Highly efficient, capable of 288 kW of cooling with warm water Easy access to components |
| i. A weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot; and; | <p>Below is an image of the HashRaQ depicting a weir located under the Power Dispersion Units along the center walls of the interior of the tank. This weir is adjacent to all appliance slots and adapted to allow for substantially uniform recovery of the dielectric fluid flowing through the appliance slots. The weir is indicated by red arrows and is a metal wall in the tank which separates the fluid from the overflow reservoir. This can be seen in the image below:</p>  |

| Claim Element(s) | Where Found in Accused Instrumentalities |
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| | <p>The HashRaQ Max directly infringes this limitation for the reasons identified above.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the mesh described above is integrated into the long sidewall of the tank for the purpose of enabling dielectric fluid to pass through and fall by gravity into a receiving reservoir. In this way, the mesh acts as an overflow lip above a gravity fed dielectric fluid recovery reservoir. This has an equivalent function as the weir as claimed and operates by allowing warmer dielectric fluid to flow by gravity from the tank, thereby enabling removal of heat from the computers while keeping the computers fully immersed. The mesh has openings that act as an overflow lip to allow warmed fluid to uniformly flow from the tank into the reservoir.</p> |
| <p>ii. A dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric fluid as it flows over the weir;</p> | <p>Below is an image of the HashRaQ depicting a fluid recovery reservoir which are depicted underneath the power distribution units and cable management system. The reservoir has pipes exiting the tank near the center of the unit. The fluid recovery reservoir is indicated by a red rectangle and arrows in the image below:</p>  <p>The HashRaQ Max directly infringes this limitation as set forth herein.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the mesh described above is integrated into the long sidewall of the tank for enabling dielectric fluid to pass through and fall by gravity into a structure that is equivalent to a receiving reservoir. This has an equivalent function as the recovery reservoir as claimed and operates by receiving dielectric fluid by a gravity flow and allowing a pump to move fluid from the reservoir for cooling and then recirculation in the tank.</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
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| b. A primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising: | <p>Below is an image of the HashRaQ indicating that the image contains a cooling distribution unit, which circulates the hot fluid flowing form the tank through the cooling system, and then circulates the cool fluid back through the tank. This meets the claim limitation of a primary circulation facility.</p>  <p>Power Distribution Unit (PDU)</p> <ul style="list-style-type: none"> Designed to match cryptocurrency mining power demands Multiple brands/models available to choose from Ideal number of outlets for optimal cable management for network switches <p>Racks</p> <ul style="list-style-type: none"> Support up to 48 Bitmain S19 miners (not included) Space-optimized, made from 100% post-industrial recycled materials Nestable racks reduce shipping costs Durable lightweight plastic makes deployment quick and easy Integrated space for network switches <p>Frame</p> <ul style="list-style-type: none"> Flat-packed frame reduces shipping costs Minimizes footprint by nesting the CDU underneath <p>Monitoring System</p> <ul style="list-style-type: none"> Checks coolant pressure, temperatures, and levels to ensure efficient operation Identifies faults to maximize uptime <p>Cooling Distribution Unit (CDU)</p> <ul style="list-style-type: none"> Highly efficient, capable of 288 kW of cooling with warm water Easy access to components |

| Claim Element(s) | Where Found in Accused Instrumentalities |
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| | <p>Below is an infographic that shows the operation of the cooling distribution unit. The HashRaQ Max directly infringes this limitation as set forth herein.</p>  <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents because the HashRaQ Max contains a fully integrated coolant distribution unit or CDU. This CDU is fed by the pump(s) of the HashRaQ Max move heated fluid from the recovery reservoir for cooling in a heat exchanger, and then recirculate the cooled fluid back into the tank. These two systems are managed by the intelligent controls.</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
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| <p>i. A plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upward through each appliance slot; and</p> | <p>Below is an image of the HashRaQ which depicts a plenum positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upward through each appliance slot.</p>  <p>The HashRaQ Max directly infringes this limitation as set forth herein.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the structure is substantially at the bottom of the tank and is</p> |

| Claim Element(s) | Where Found in Accused Instrumentalities |
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| | constructed to enable cooled fluid to flow upwardly through the computers, thereby allowing the computers to transfer heat to the rising fluid. The warmed fluid is then removed from the top of tank over the weir structure as previously described. |
| c. A control facility adapted to control the operation of the primary fluid circulation facility as a function of the temperature of the dielectric fluid in the tank. | <p>The HashRaQ has a Coolant Distribution Unit that operates as a control facility. This is confirmed below in a HashRaQ Max information sheet under monitoring and reporting. This information sheet details a control system adapted to control the operation of the primary and secondary circulation facilities as a function of the temperature of the dielectric fluid in the tank.</p> <p>The HashRaQ Max directly infringes this limitation as set forth herein.</p> <p>Alternatively, the HashRaQ Max infringes this limitation under the doctrine of equivalents as the HashRaQ Max is designed to maintain the computers at a proper temperature, and uses electrically controlled coolant distribution unit, pumps and heat dispersion units to move dielectric fluid from the heat exchanger throughout the tank, and the water or water/glycol solution to the heat dispersion unit for cooling.</p> <div data-bbox="440 1010 1433 1627"> <h3>How GRC Liquid Immersion Cooling Works</h3> <p>The diagram illustrates the GRC Liquid Immersion Cooling system. It consists of three main components: Open Data Center Server Racks, a Coolant Distribution Unit, and Final Heat Rejection Options. The server racks are filled with circulating single-phase coolant. Red arrows indicate the flow of heated coolant exiting the top of the racks. Blue arrows show the coolant returning to the racks from the heat exchanger. The Coolant Distribution Unit contains a Coolant Pump and a Coolant-to-water heat exchange. The Final Heat Rejection Options include an Evaporative Cooling Tower, a Dry Cooler, and an Existing Chilled Water Loop.</p> <p>Heated coolant exits top of rack. Coolant returns to rack from heat exchanger at user-specified temperature.</p> </div> |

| Claim Element(s) | Where Found in Accused Instrumentalities | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | <div data-bbox="483 296 1442 432">  </div> <div data-bbox="493 468 764 489">General Product Specifications</div> <table border="1" data-bbox="483 495 954 926"> <tr><td>Number of Immersion-Cooled Racks</td><td>2</td></tr> <tr><td>Total Miner Capacity</td><td>48 Bitmain S19 miners</td></tr> <tr><td>Number of CDUs per Double-Capacity Rack</td><td>1³</td></tr> <tr><td>Total Cooling Capacity</td><td></td></tr> <tr><td>Chiller-Free Water: 40°C (104°F)</td><td>288 kW⁴</td></tr> <tr><td>Over-Clocking Capability</td><td>6 kW/miner⁵</td></tr> <tr><td>pPUE⁶</td><td><1.02</td></tr> <tr><td colspan="2">Standard PDU Details</td></tr> <tr><td>Quantity</td><td>Four</td></tr> <tr><td>Outlets</td><td>24 C19 each</td></tr> <tr><td>Architecture</td><td>Basic</td></tr> <tr><td>Circuit Breaker Amps</td><td>160A each</td></tr> <tr><td>Alternate PDUs Available</td><td></td></tr> <tr><td>Overall Dimensions (L x W x H)</td><td>2.85 m x 1.97 m x 1.55 m (9.4 ft x 6.5 ft x 5.1 ft)</td></tr> <tr><td colspan="2">Estimated Component Weights</td></tr> <tr><td>Racks, CDU, and Stand</td><td>227 kg (500 lbs)</td></tr> <tr><td>Coolant</td><td>860 kg (1894 lbs)</td></tr> <tr><td>Estimated Weight When Commissioned⁷</td><td>1950 kg (4300 lbs)</td></tr> </table> <div data-bbox="493 947 646 968">Power and Water</div> <table border="1" data-bbox="483 974 954 1325"> <tr><td>Final Heat Rejection Options</td><td>Flexible options can include: Adiabatic/evaporative cooling tower Dry cooler⁸</td></tr> <tr><td>Water Requirements</td><td>Maximum particulate size 0.8 mm⁹ Input temperature 40°C (104°F) Recirculating flow 29.5 m³/hr (130 gpm) 6 to 9°C dT (10 to 15°F dT) Connection 73.0 mm (2.5") male Victaulic</td></tr> <tr><td>CDU Power Requirements</td><td>1x 3PH 460VAC 60Hz, max power consumption 3.7kW</td></tr> <tr><td>PDU Power Requirements</td><td>4x 160A 415Y/240VAC¹⁰</td></tr> </table> <div data-bbox="980 468 1208 489">Monitoring and Reporting</div> <table border="1" data-bbox="971 495 1442 646"> <tr><td>Platform</td><td>IoT with Modbus TCP/IP for BMS interface</td></tr> <tr><td>Alerting</td><td>Alerts via DCIM platform</td></tr> <tr><td>DCIM/BMS Integration Protocols</td><td>Modbus</td></tr> <tr><td>Measurements and Fault Detection</td><td>Operating temperatures of coolant and water Coolant pressure Coolant levels</td></tr> </table> <div data-bbox="980 674 1143 695">Site Requirements</div> <table border="1" data-bbox="971 701 1442 856"> <tr><td>Client provides</td><td>Access to power and recirculating water¹¹ Secondary containment Level surface (slab or raised floor) with slope <1/650 Standard data center fire suppression as required</td></tr> <tr><td>Operating Environment</td><td>Ambient temperature 5 to 45°C (40 to 113°F)</td></tr> </table> <div data-bbox="980 884 1192 905">Delivery and Installation</div> <table border="1" data-bbox="971 911 1442 993"> <tr><td>Lead Time</td><td>Typically ships within 12 weeks after receipt of purchase order.</td></tr> <tr><td>Shipping Terms</td><td>Ex-Works</td></tr> <tr><td>On-site Installation and Training¹²</td><td>One business day per unit</td></tr> </table> <div data-bbox="980 1020 1062 1041">Warranty</div> <table border="1" data-bbox="971 1047 1442 1129"> <tr><td>Includes 90-day limited warranty against defects in material and workmanship with limited support. Annual monitoring plans</td><td>Other plans available for additional cost: Full year limited warranties and support plans Annual maintenance plans</td></tr> </table> <div data-bbox="971 1150 1474 1304"> <p>³ An additional spare CDU available for additional cost.</p> <p>⁴ CDU is designed for up to 288 kW (6 kW per miner). Actual cooling capacity will depend on end user's specified level of overclocking, as well as final heat rejection system.</p> <p>⁵ Over-clocking greater than 6 kW/miner may require colder/chilled water.</p> <p>⁶ General specification assuming 6 kW/miner. Values will change if end user utilizes less over-clocking.</p> <p>⁷ Includes coolant, mining equipment, cables, and cords. Actual weight depends on configuration.</p> <p>⁸ System cooling performance dependent on climate.</p> <p>⁹ Failures resulting from particulates exceeding 0.8mm or poor water quality will void warranty.</p> <p>¹⁰ One input power feed per PDU.</p> <p>¹¹ GRC and HTS can assist in heat rejection design/implementation.</p> <p>¹² Installation applies to installing the rack in the data center space only and does not include installation of digital asset mining equipment.</p> </div> <div data-bbox="1224 1346 1451 1430">  <p>THE IMMERSION COOLING AUTHORITY®</p> </div> | Number of Immersion-Cooled Racks | 2 | Total Miner Capacity | 48 Bitmain S19 miners | Number of CDUs per Double-Capacity Rack | 1 ³ | Total Cooling Capacity | | Chiller-Free Water: 40°C (104°F) | 288 kW ⁴ | Over-Clocking Capability | 6 kW/miner ⁵ | pPUE ⁶ | <1.02 | Standard PDU Details | | Quantity | Four | Outlets | 24 C19 each | Architecture | Basic | Circuit Breaker Amps | 160A each | Alternate PDUs Available | | Overall Dimensions (L x W x H) | 2.85 m x 1.97 m x 1.55 m (9.4 ft x 6.5 ft x 5.1 ft) | Estimated Component Weights | | Racks, CDU, and Stand | 227 kg (500 lbs) | Coolant | 860 kg (1894 lbs) | Estimated Weight When Commissioned ⁷ | 1950 kg (4300 lbs) | Final Heat Rejection Options | Flexible options can include: Adiabatic/evaporative cooling tower Dry cooler ⁸ | Water Requirements | Maximum particulate size 0.8 mm ⁹ Input temperature 40°C (104°F) Recirculating flow 29.5 m ³ /hr (130 gpm) 6 to 9°C dT (10 to 15°F dT) Connection 73.0 mm (2.5") male Victaulic | CDU Power Requirements | 1x 3PH 460VAC 60Hz, max power consumption 3.7kW | PDU Power Requirements | 4x 160A 415Y/240VAC ¹⁰ | Platform | IoT with Modbus TCP/IP for BMS interface | Alerting | Alerts via DCIM platform | DCIM/BMS Integration Protocols | Modbus | Measurements and Fault Detection | Operating temperatures of coolant and water Coolant pressure Coolant levels | Client provides | Access to power and recirculating water ¹¹ Secondary containment Level surface (slab or raised floor) with slope <1/650 Standard data center fire suppression as required | Operating Environment | Ambient temperature 5 to 45°C (40 to 113°F) | Lead Time | Typically ships within 12 weeks after receipt of purchase order. | Shipping Terms | Ex-Works | On-site Installation and Training ¹² | One business day per unit | Includes 90-day limited warranty against defects in material and workmanship with limited support. Annual monitoring plans | Other plans available for additional cost: Full year limited warranties and support plans Annual maintenance plans |
| Number of Immersion-Cooled Racks | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Miner Capacity | 48 Bitmain S19 miners | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of CDUs per Double-Capacity Rack | 1 ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Cooling Capacity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chiller-Free Water: 40°C (104°F) | 288 kW ⁴ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Over-Clocking Capability | 6 kW/miner ⁵ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pPUE ⁶ | <1.02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standard PDU Details | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Quantity | Four | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outlets | 24 C19 each | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Architecture | Basic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Circuit Breaker Amps | 160A each | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alternate PDUs Available | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Overall Dimensions (L x W x H) | 2.85 m x 1.97 m x 1.55 m (9.4 ft x 6.5 ft x 5.1 ft) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Estimated Component Weights | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Racks, CDU, and Stand | 227 kg (500 lbs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Coolant | 860 kg (1894 lbs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Estimated Weight When Commissioned ⁷ | 1950 kg (4300 lbs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Final Heat Rejection Options | Flexible options can include: Adiabatic/evaporative cooling tower Dry cooler ⁸ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water Requirements | Maximum particulate size 0.8 mm ⁹ Input temperature 40°C (104°F) Recirculating flow 29.5 m ³ /hr (130 gpm) 6 to 9°C dT (10 to 15°F dT) Connection 73.0 mm (2.5") male Victaulic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CDU Power Requirements | 1x 3PH 460VAC 60Hz, max power consumption 3.7kW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PDU Power Requirements | 4x 160A 415Y/240VAC ¹⁰ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Platform | IoT with Modbus TCP/IP for BMS interface | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alerting | Alerts via DCIM platform | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCIM/BMS Integration Protocols | Modbus | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements and Fault Detection | Operating temperatures of coolant and water Coolant pressure Coolant levels | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client provides | Access to power and recirculating water ¹¹ Secondary containment Level surface (slab or raised floor) with slope <1/650 Standard data center fire suppression as required | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Environment | Ambient temperature 5 to 45°C (40 to 113°F) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead Time | Typically ships within 12 weeks after receipt of purchase order. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shipping Terms | Ex-Works | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| On-site Installation and Training ¹² | One business day per unit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Includes 90-day limited warranty against defects in material and workmanship with limited support. Annual monitoring plans | Other plans available for additional cost: Full year limited warranties and support plans Annual maintenance plans | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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| 44070 | 7590 | 11/04/2016 |
| J. V. MYERS & ASSOCIATES, P.C. | | |
| P. O. BOX 130 | | |
| DRIFTWOOD, TX 78619 | | |

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| EXAMINER | |
| RUSSELL, DEVON L | |

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| ART UNIT | PAPER NUMBER |
| 3744 | |

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|-------------------|---------------|
| NOTIFICATION DATE | DELIVERY MODE |
| 11/04/2016 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

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jvm@jvmyers.com
 jp@jvmyers.com
 aap@jvmyers.com



Office Action SummaryApplication No.
14/355,533Applicant(s)
BOYD ET AL.Examiner
DEVON RUSSELLArt Unit
3744AIA (First Inventor to File)
Status
No**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/30/14.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-10 is/are pending in the application.
5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-10 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 4/30/14 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date ____.
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 4) ☐ Other: ____.

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2 and 7 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

The term “tightly co-located” is not sufficiently understood, or specially defined by the specification, for its metes and bounds to be definite.

Claim Rejections - 35 USC § 103

3. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-10 are rejected under pre-AIA 35 U.S.C. 102 (b) as anticipated by Best (US 2011/0132579) or, in the alternative, under pre-AIA 35 U.S.C. 103(a) as obvious over Best in view of Pfahnl et al. (US 2006/0126292).

Regarding claims 1 and 6, Best teaches an appliance immersion cooling system comprising: a tank (e.g. 610, 710, 810) adapted to immerse (622, 722, 822) in a dielectric fluid (Para. [0025]) a plurality of electrical appliances (120), each in a respective appliance slot (Figs. 4, 6, 11) distributed vertically along, and extending transverse to, a long wall of the tank (L; e.g. Figs. 3-4), the tank comprising: a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot (Para. [0102]; the "common manifold area" defined by the tops of the slots and the devices 120, 820);

a primary circulation facility adapted to circulate the dielectric fluid through the tank (see 440/450, 540/550, etc.), comprising: a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot (Para. [0086]; Figs. 5-6; H_L); a secondary fluid circulation

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facility adapted to extract heat from the dielectric fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted (150; 250; 350); and a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank (380, 370; Fig. 2, “temp data”).

If it is not accepted that Best positively discloses the weir, Pfahnl also teaches a cooling system wherein a dielectric fluid (air) as a coolant fully surrounds a rack (see figures) of electrical appliances (servers) in a tank (118), wherein the dielectric fluid is introduced (via 110a) into a plenum (110) positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot (as directed by openings 122) and a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots (the bottom wall of 112 with openings 122) adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot (via 122).

It would have been obvious to one of ordinary skill in the art at the time of the invention to form the manifold of Best with the weir formed as a bottom wall of said manifold with holes opening between each of the electronic device slots, as taught by Pfahnl, such that the dielectric fluid would still be directed in its proper flow direction despite the lack of a full rack of electronic devices.

Best further teaches that: the tank and primary circulation facility comprise a tightly co-located module (the devices are all inherently physically connected to one

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another and located in the same facility; see also Figs. 1B or 11), as per claims 2 and 7; interconnect panel facilities adapted to mount appliance support equipment (840), as per claims 3 and 8; first and second primary circulation sub-facilities (880 on the left/right of tank; e.g. Fig. 14), each adapted to operate independently to circulate the dielectric fluid through the tank (see Fig. 14), the control facility is further adapted to coordinate the operation of the first and second primary circulation sub-facilities and the secondary fluid circulation facilities to maintain the temperature of the dielectric fluid in the tank substantially between a predetermined minimum temperature and a predetermined maximum temperature (Para. [0082]), as per claims 4 and 9; and, the control facility (380) further comprises a communication facility (its software; Para. [0082] which performs the communications) adapted to facilitate monitoring and control of the control facility from a remote location (Para. [0081]-[0082]), as per claims 5 and 10.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVON RUSSELL whose telephone number is (571)270-1858. The examiner can normally be reached on M-Th, 9-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Elve can be reached on 571.272.1173. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DEVON RUSSELL/
Examiner, Art Unit 3744

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Christopher L. Boyd, *et al.*
Serial No.: 14/355,533
Filed: 30 April 2014
For: Appliance Immersion Cooling
System

31 January 2017

Art Unit: 3744
Examiner: D. Russell

Amendment

HONORABLE COMMISSIONER OF PATENTS AND TRADEMARKS,

SIR:

In the Office Action mailed 4 November 2016 (Office Action), the Examiner rejected claims 1-10 in the subject Application. In response, Applicants submit the following amendments and remarks:



Claims

1. (Presently amended) An appliance immersion cooling system comprising:
 - a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising:
 - a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot;
 - a primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising:
 - a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot;
 - a secondary fluid circulation facility adapted to extract heat from the dielectric fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted; and
 - a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank.
2. (Presently amended) The system of claim 1 wherein the tank and primary circulation facility comprise a ~~tightly co-located~~ highly-integrated module.
3. (Original) The system of claim 1 wherein the tank further comprises:
 - an interconnect panel facility adapted to mount appliance support equipment.

4. (Original) The system of claim 1 wherein the primary circulation facility further comprises:

at least first and second primary circulation sub-facilities, each adapted to operate independently to circulate the dielectric fluid through the tank;

wherein the control facility is further adapted to coordinate the operation of the first and second primary circulation sub-facilities and the secondary fluid circulation facilities so to maintain the temperature of the dielectric fluid in the tank substantially between a predetermined minimum temperature and a predetermined maximum temperature.

5. (Original) The system of claim 1 wherein the control facility further comprises a communication facility adapted to facilitate monitoring and control of the control facility from a remote location.

6. (Presently amended) A tank module adapted for use in an appliance immersion cooling system, the tank module comprising:

- a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising:

- a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot;

- a primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising:

- a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot;
 - and

- a control facility adapted to control the operation of the primary fluid circulation facility as a function of the temperature of the dielectric fluid in the tank.

7. (Presently amended) The module of claim 6 wherein the tank and primary circulation facility comprise a ~~tightly co-located~~ highly-integrated module.

8. (Original) The module of claim 6 wherein the tank further comprises:

- an interconnect panel facility adapted to mount appliance support equipment.

9. (Original) The module of claim 6 wherein the primary circulation facility further comprises:

- at least first and second primary circulation sub-facilities, each adapted to operate independently to circulate the dielectric fluid through the tank;

wherein the control facility is further adapted to coordinate the operation of the first and second primary circulation sub-facilities so to maintain the temperature of the dielectric fluid in the tank substantially between a predetermined minimum temperature and a predetermined maximum temperature.

10. (Original) The module of claim 6 wherein the control facility further comprises a communication facility adapted to facilitate monitoring and control of the control facility from a remote location.

Remarks

1. In the Office Action, the Examiner rejected claims 2 and 7 under 35 USC 112(b) as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventors regard as their invention. In particular, the Examiner has asserted that the term "tightly co-located" is not sufficiently understood, or specifically defined by the specification, for its metes and bounds to be definite. As explained in paragraph [0044], the Applicants intend the term "tightly co-located" to characterize the essential components of the primary circulation facility 28 as being physically located sufficiently close to the tank 14 "so as to form a highly-integrated module", see, lines 6-8. As noted in lines 3-6, the principle purpose in so arranging these components is to "move the secondary fluid to the point of heat exchange with the primary fluid, rather than to move the primary fluid to the point of exchange with the secondary fluid." As noted, "[i]n addition to conserving valuable floor space in a typical data center installation, the resulting modular configuration facilitates both easy initial installation and subsequent upgrade to efficiently satisfy increasing data center workloads", see, lines 14-17. In view of these details and the example configuration set forth in the drawings, Applicants respectfully submit that the term "tightly co-located" *is* sufficiently well defined to satisfy the requirements of 35 USC §112(b). Notwithstanding, in an effort to reduce issues, Applicants have amended claims 2 and 7 to replace the term "tightly co-located" with the term "highly-integrated", an alternative term used in the specification to describe this physical arrangement.

2. In the Office Action, the Examiner has rejected 1-10 under 35 USC §102(b) as anticipated by US Application Serial No. 2011/0132579, Best, *et al.* ("Best"). In section 5 of the Office Action, the Examiner has suggested that, in Best, the "common manifold area" defined between the tops of the devices and the surface of the fluid corresponds to Applicants' "weir"; and that the "common manifold area" defined between the bottoms of the devices and the bottom of the tank corresponds to Applicants' "plenum". However, neither of these "pseudo-structures" is present when the tank is empty of fluid; whereas both of these physical structures are required by Applicants' apparatus claims 1 and 6, even in the absence of fluid.

Perhaps recognizing that this §102(b) position is not as strong as might be desired, the Examiner has, in the alternative, rejected claims 1-10 under 35 USC 1§03(a) as being obvious over Best in view of US Application Serial No. 2006/0126292, Pfannl, *et al.* ("Pfannl"). In this rejection, the Examiner has suggested that, in Pfannl, the openings 122 into the outlet plenum 112, collectively, perform substantially the same function as Applicants' weir. However, Applicants respectfully note that, in both claim 1 and claim 6, the weir is defined as being "integrated horizontally into the long wall of the tank adjacent all appliance slots, [and] adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot". In contrast, in Pfannl, each of the openings 122 into the plenum 112 is disposed adjacent only to a respective single ONE of the appliance slots, and none is disposed adjacent to ALL of the appliance slots. Further, the rate of air flow through each of the openings 122 into the plenum 112 is NOT substantially uniform since the outlet port 112a itself does not lie adjacent to each of the openings 122. It follows, therefore, that the function performed by the set of openings 122 into the plenum 112 is **not** equivalent to the function performed by Applicants' weir.

In an effort to further distinguish Applicants' weir from the plenum structure in Pfannl, Applicants have amended claims 1 and 6 to emphasize that it is the "overflow lip" of the weir that is "adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot". Support for this amendment can be found in paragraph [0029].

3. Applicants respectfully submit that claims 1-10, as amended herein, patentably distinguish over the prior art of record. Accordingly, Applicants request reconsider of the claims, as amended herein, and allowance thereof.

Respectfully submitted,
Christopher L. Boyd, *et al.*

/Jeffrey Van Myers/

Jeffrey Van Myers
Attorney for Applicants
Reg. No. 27,362
Ph: 512.858.7453

Electronic Acknowledgement Receipt

| | |
|---|--------------------------------------|
| EFS ID: | 28222415 |
| Application Number: | 14355533 |
| International Application Number: | |
| Confirmation Number: | 3995 |
| Title of Invention: | Appliance Immersion Cooling System |
| First Named Inventor/Applicant Name: | Christopher L. Boyd |
| Customer Number: | 44070 |
| Filer: | Jeffrey Van Myers |
| Filer Authorized By: | |
| Attorney Docket Number: | JMG001-01 |
| Receipt Date: | 31-JAN-2017 |
| Filing Date: | 30-APR-2014 |
| Time Stamp: | 16:43:59 |
| Application Type: | U.S. National Stage under 35 USC 371 |

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| Submitted with Payment | no |
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File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|--|----------------------|--|------------------|------------------|
| 1 | Applicant Arguments/Remarks Made in an Amendment | JMG001_a1_170131.pdf | 88486 | no | 7 |
| | | | 001d7c1fcb32be57d664d6d110518f89e7d f96bc | | |

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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| | | | |
|---|---|----------------------------------|---------------------------------------|
| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | Application or Docket Number 14/355,533 | Filing Date 04/30/2014 | <input type="checkbox"/> To be Mailed |
|---|---|----------------------------------|---------------------------------------|

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO**APPLICATION AS FILED – PART I**

(Column 1)

(Column 2)

| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) |
|--|---|--------------|-----------|----------|
| <input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| <input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| <input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X \$ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X \$ = | |
| <input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

| AMENDMENT | 01/31/2017 | CLAIMS REMAINING AFTER AMENDMENT | Minus | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) |
|-----------------|--|----------------------------------|-------|------------------------------------|---------------|-----------|---------------------|
| | Total (37 CFR 1.16(i)) | * 10 | Minus | ** 20 | = 0 | X \$40 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 2 | Minus | ***3 | = 0 | X \$210 = | 0 |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| TOTAL ADD'L FEE | | | | | | 0 | |

(Column 1)

(Column 2)

(Column 3)

| AMENDMENT | CLAIMS REMAINING AFTER AMENDMENT | Minus | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) |
|-----------------|--|-------|------------------------------------|---------------|-----------|---------------------|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X \$ = |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X \$ = |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | |
| TOTAL ADD'L FEE | | | | | | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
CAROL BARNES

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 14/355,533 | 04/30/2014 | Christopher L. Boyd | JMG001-01 | 3995 |

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| 44070 | 7590 | 05/17/2017 |
| J. V. MYERS & ASSOCIATES, P.C. | | |
| P. O. BOX 130 | | |
| DRIFTWOOD, TX 78619 | | |

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| EXAMINER | |
| RUSSELL, DEVON L | |

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| ART UNIT | PAPER NUMBER |
| 3744 | |

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|-------------------|---------------|
| NOTIFICATION DATE | DELIVERY MODE |
| 05/17/2017 | ELECTRONIC |

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jvm@jvmyers.com
 jp@jvmyers.com
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Office Action SummaryApplication No.
14/355,533Applicant(s)
BOYD ET AL.Examiner
DEVON RUSSELLArt Unit
3744AIA (First Inventor to File)
Status
No**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

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- 1) ☒ Responsive to communication(s) filed on 1/31/17.
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- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-10 is/are pending in the application.
5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-10 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date ____.
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 4) ☐ Other: ____.

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DETAILED ACTION

Claim Amendments

1. The claims dated 1/31/17 are entered. Claims 1-2 and 6-7 are amended. Claims 1-10 are pending and addressed below

Claim Rejections - 35 USC § 103

2. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-10 are rejected under pre-AIA 35 U.S.C. 102 (b) as anticipated by Best (US 2011/0132579) or, in the alternative, under pre-AIA 35 U.S.C. 103(a) as obvious over Best in view of Pfahnl et al. (US 2006/0126292).

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Regarding claims 1 and 6, Best teaches an appliance immersion cooling system comprising: a tank (e.g. 510, 610, 710, 810) adapted to immerse (622, 722, 822) in a dielectric fluid (Para. [0025]) a plurality of electrical appliances (120), each in a respective appliance slot (Figs. 4, 6, 11) distributed vertically along, and extending transverse to, a long wall of the tank (L; e.g. Figs. 3-4), the tank comprising: a weir (e.g. 450, 550, heated liquid coolant outlet in Fig. 14, etc.) having an overflow lip (the bottom lip of the opening (interpreted as in the applicant's specification wherein the 'lip' is only the bottom surface of the opening 22), integrated horizontally into the long wall of the tank adjacent all appliance slots (see the long wall in each figure in which the weir is located), adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot (Para. [0102]; the "common manifold area" defined by the tops of the slots and the devices 120, 820);

a primary circulation facility adapted to circulate the dielectric fluid through the tank (see 440/450, 540/550, etc.), comprising: a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot (Para. [0086]; Figs. 5-6; H_L); a secondary fluid circulation facility adapted to extract heat from the dielectric fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted (150; 250; 350); and a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank (380, 370; Fig. 2, "temp data").

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If it is not accepted that Best positively discloses the weir, Pfahnl also teaches a cooling system wherein a dielectric fluid (air) as a coolant fully surrounds a rack (see figures) of electrical appliances (servers) in a tank (118), wherein the dielectric fluid is introduced (via 110a) into a plenum (110) positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot (as directed by openings 122) and a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots (the bottom wall of 112 with openings 122) adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot (via 122).

It would have been obvious to one of ordinary skill in the art at the time of the invention to form the manifold of Best with the weir formed as a bottom wall of said manifold with holes opening between each of the electronic device slots, as taught by Pfahnl, such that the dielectric fluid would still be directed in its proper flow direction despite the lack of a full rack of electronic devices.

Best further teaches that: the tank and primary circulation facility comprise a highly integrated module (the devices are all inherently physically connected to one another and located in the same facility; see also Figs. 1B or 11), as per claims 2 and 7; interconnect panel facilities adapted to mount appliance support equipment (840), as per claims 3 and 8; first and second primary circulation sub-facilities (880 on the left/right of tank; e.g. Fig. 14), each adapted to operate independently to circulate the dielectric fluid through the tank (see Fig. 14), the control facility is further adapted to

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coordinate the operation of the first and second primary circulation sub-facilities and the secondary fluid circulation facilities to maintain the temperature of the dielectric fluid in the tank substantially between a predetermined minimum temperature and a predetermined maximum temperature (Para. [0082]), as per claims 4 and 9; and, the control facility (380) further comprises a communication facility (its software; Para. [0082] which performs the communications) adapted to facilitate monitoring and control of the control facility from a remote location (Para. [0081]-[0082]), as per claims 5 and 10.

Response to Arguments

5. Applicant's arguments filed 1/31/17 have been fully considered but they are not persuasive.

In regards to the assertion that the "plenum" of Best is a pseudo-structure only present when the tank is full of fluid, the examiner disagrees. The plenum is defined by the walls and bottom of the tank and the bottom surfaces of the devices 120. In the optionally presented 103 rejection, the plenum is also structurally defined by the piece forming openings 122 in the bottom portion 110.

Applicant's arguments that the "weir" in the prior art does not lie adjacent "all appliance slots" the examiner believes that grammatically, the phrase "adjacent all appliance slots", as presently claimed modifies "the long wall of the tank" and not the weir. Furthermore, as described by Best, the positioning of his weirs still results in even flow through the devices as described in paragraph [0102].

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Finally, the examiner would like to point out that, as far as the “weir” structure is defined in the disclosure it merely amounts to an opening in a wall and its “lip” is never defined as more than the bottom surface of that opening. If the applicant believes that there is further structural limitation that should be associated with the term weir, he is requested to point out where the disclosure supports that in any further communications.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVON RUSSELL whose telephone number is (571)270-1858. The examiner can normally be reached on M-Th, 9-4.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Elve can be reached on 571.272.1173. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DEVON RUSSELL/
Primary Examiner, Art Unit 3744



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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 14/355,533 | 04/30/2014 | Christopher L. Boyd | JMG001-01 | 3995 |

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| 44070 | 7590 | 06/11/2018 |
| J. V. MYERS & ASSOCIATES, P.C. | | |
| P. O. BOX 130 | | |
| DRIFTWOOD, TX 78619 | | |

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| EXAMINER | |
| RUSSELL, DEVON L | |

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| ART UNIT | PAPER NUMBER |
| 3744 | |

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|-------------------|---------------|
| NOTIFICATION DATE | DELIVERY MODE |
| 06/11/2018 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvm@jvmyers.com
 jp@jvmyers.com
 aap@jvmyers.com



Office Action SummaryApplication No.
14/355,533Applicant(s)
BOYD ET AL.Examiner
DEVON RUSSELLArt Unit
3744AIA (First Inventor to File)
Status
No**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/9/18.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-16 is/are pending in the application.
5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-16 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date ____.
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 4) ☐ Other: ____.

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DETAILED ACTION

Claim Amendments

1. The claims dated 8/24/17 are entered. Claims 1 and 6 are amended. Claims 11-16 are newly entered. Claims 1-16 are pending and addressed below

Claim Rejections - 35 USC § 112

2. The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-10 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

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The metes and bounds of “adapted smoothly”, in claims 1 and 6, are not known. It is not clear what it means to adapt an item smoothly. Furthermore, if the intention was to read smoothly as modifying a different item of the claim, such as the following discussion of receiving, it is not clear what it would mean to receive the fluid smoothly as opposed to not smoothly. No guidance was located in the specification.

Claims 2-5 and 7-10 are also rejected for depending from claims 1 and 6.

Claim Rejections - 35 USC § 103

4. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-16 are rejected under pre-AIA 35 U.S.C. 103(a) as obvious over Best (US 2011/0132579) in view of JP 5956100 B1 ('100).

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Regarding claims 1 and 6, Best teaches an appliance immersion cooling system comprising: a tank (e.g. 510, 610, 710, 810) adapted to immerse (622, 722, 822) in a dielectric fluid (Para. [0025]) a plurality of electrical appliances (120), each in a respective appliance slot (Figs. 4, 6, 11) distributed vertically along, and extending transverse to, a long wall of the tank (L; e.g. Figs. 3-4), the tank comprising:

an outlet (e.g. 450, 550, heated liquid coolant outlet in Fig. 14, etc.) having an overflow lip (the bottom lip of the opening, interpreted as in the applicant's specification wherein the 'lip' is only the bottom surface of the opening 22), integrated horizontally into the long wall of the tank adjacent all appliance slots (see the long wall in each figure in which the weir is located), adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot (Para. [0102]; the "common manifold area" defined by the tops of the slots and the devices 120, 820);

a primary circulation facility adapted to circulate the dielectric fluid through the tank (see 440/450, 540/550, etc.), comprising: a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot (Para. [0086]; Figs. 5-6; H_L); a secondary fluid circulation facility adapted to extract heat from the dielectric fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted (150; 250; 350); and a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank (380, 370; Fig. 2, "temp data").

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Best does not teach the weir and reservoir arrangement.

'100 teaches an appliance immersion cooling system (see Figs.) with a weir (127) integrated horizontally into the long wall of the tank (see Fig. 4) adjacent all appliance slots (14) having an overflow lip (bottom lip of 127) adapted to facilitate substantially uniform recover of the dielectric fluid flowing through each appliance slot (Para. 0034 and 0036); and a dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric fluid as it flows over the weir (see reservoir in Fig. 2 attached directly behind and below the weir 127).

It would have been obvious to one of ordinary skill in the art at the time of the invention to form the outlet of Best as the weir and reservoir, as taught by '100, in order to accommodate extra fluid displacement due to the insertion of additional electronic device and/or to allow for uniform removal of heated fluid from all appliance locations.

Best further teaches that: the tank and primary circulation facility comprise a highly integrated module (the devices are all inherently physically connected to one another and located in the same facility; see also Figs. 1B or 11), as per claims 2 and 7; interconnect panel facilities adapted to mount appliance support equipment (840), as per claims 3 and 8; first and second primary circulation sub-facilities (880 on the left/right of tank; e.g. Fig. 14), each adapted to operate independently to circulate the dielectric fluid through the tank (see Fig. 14), the control facility is further adapted to coordinate the operation of the first and second primary circulation sub-facilities and the secondary fluid circulation facilities to maintain the temperature of the dielectric fluid in

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the tank substantially between a predetermined minimum temperature and a predetermined maximum temperature (Para. [0082]), as per claims 4 and 9; and, the control facility (380) further comprises a communication facility (portion of controller which communicates with other equipment; Para. [0082] which performs the communications) adapted to facilitate monitoring and control of the control facility from a remote location (Para. [0081]-[0082]), as per claims 5 and 10.

Regarding claim 11, Best teaches a tank module adapted for use in an appliance immersion cooling system, the tank module comprising: a tank (e.g. 510, 610, 710, 810) adapted to immerse (622, 722, 822) in a dielectric fluid (Para. [0025]) a plurality of electrical appliances (120), each in a respective appliance slot (Figs. 4, 6, 11) distributed vertically along, and extending transverse to, a long wall of the tank (L; e.g. Figs. 3-4), the tank comprising:

an outlet (e.g. 450, 550, heated liquid coolant outlet in Fig. 14, etc.), adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot (Para. [0102]; the "common manifold area" defined by the tops of the slots and the devices 120, 820);

a primary circulation facility adapted to circulate the dielectric fluid through the tank (see 440/450, 540/550, etc.), comprising:

a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot (Para. [0086]; Figs. 5-6; HL);

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and a control facility adapted to coordinate the operation of the primary fluid circulation facility as a function of the temperature of the dielectric fluid in the tank (380, 370; Fig. 2, “temp data”).

Best does not teach the weir and reservoir arrangement.

‘100 teaches an appliance immersion cooling system (see Figs.) with a weir (127) integrated horizontally into the long wall of the tank (see Fig. 4) adjacent all appliance slots (14) having an overflow lip (bottom lip of 127) adapted to facilitate substantially uniform recover of the dielectric fluid flowing through each appliance slot (Para. 0034 and 0036); and a dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric fluid as it flows over the weir (see reservoir in Fig. 2 attached directly behind and below the weir 127).

It would have been obvious to one of ordinary skill in the art at the time of the invention to form the outlet of Best as the weir and reservoir, as taught by ‘100, in order to accommodate extra fluid displacement due to the insertion of additional electronic device and/or to allow for uniform removal of heated fluid from all appliance locations.

Regarding claim 12, Best further teaches an interconnect panel facility (mounting support structures for 844; see Fig. 11) adapted to mount appliance support equipment (844).

Best further teaches that: first and second primary circulation sub-facilities (880 on the left/right of tank; e.g. Fig. 14), each adapted to operate independently to circulate

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the dielectric fluid through the tank (see Fig. 14), the control facility is further adapted to coordinate the operation of the first and second primary circulation sub-facilities and the secondary fluid circulation facilities to maintain the temperature of the dielectric fluid in the tank substantially between a predetermined minimum temperature and a predetermined maximum temperature (Para. [0082]), as per claim 13; and, the control facility (380) further comprises a communication facility (portion of controller which communicates with other equipment; Para. [0082] which performs the communications) adapted to facilitate monitoring and control of the control facility from a remote location (Para. [0081]-[0082]), as per claim 14; the tank is part of an appliance immersion cooling system (see Figs.), per claim 15; and a secondary fluid circulation facility (250, 290; 352, 354) is adapted to extract heat (in 280) from the dielectric fluid circulating in the primary circulation facility and to dissipate to the environment the heat so extracted (Para. [0072]), per claim 16.

Response to Arguments

7. Applicant's arguments with respect to claims 1-16 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

The applicant simply argues that the EPO examiner did not agree with the application of Best in view of Pfannl. The examiner disagrees that the claims presented differentiate over Best in the manner indicated by the EPO examiner. The EPO

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examiner appears to read into the claim language additional unclaimed features from the specification, which is not proper in the U.S.

Notwithstanding all of the above, the claims are currently rejected under different art as necessitated by the amendments to claims 1 and 6 and therefore the remarks are not persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVON RUSSELL whose telephone number is (571)270-1858. The examiner can normally be reached on M-Th, 9-4.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor is Ned Landrum. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DEVON RUSSELL/
Primary Examiner, Art Unit 3744

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|-----------------------------------|---------------------------------------|---|-------------|
| Notice of References Cited | Application/Control No. 14/355,533 | Applicant(s)/Patent Under Reexamination BOYD ET AL. | |
| | Examiner DEVON RUSSELL | Art Unit 3744 | Page 1 of 1 |

U.S. PATENT DOCUMENTS

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | CPC Classification | US Classification |
|---|---|--|-----------------|------|--------------------|-------------------|
| | A | US- | | | | |
| | B | US- | | | | |
| | C | US- | | | | |
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| | F | US- | | | | |
| | G | US- | | | | |
| | H | US- | | | | |
| | I | US- | | | | |
| | J | US- | | | | |
| | K | US- | | | | |
| | L | US- | | | | |
| | M | US- | | | | |

FOREIGN PATENT DOCUMENTS

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|---|---|--|-----------------|---------|------|--------------------|
| | N | JP 5956100 B1 | 07-2016 | | | G06F1/20 |
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| | R | | | | | |
| | S | | | | | |
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NON-PATENT DOCUMENTS

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |



*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
 Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 14/355,533 | 04/30/2014 | Christopher L. Boyd | JMG001-01 | 3995 |

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| 44070 | 7590 | 07/06/2017 |
| J. V. MYERS & ASSOCIATES, P.C. | | |
| P. O. BOX 130 | | |
| DRIFTWOOD, TX 78619 | | |

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| EXAMINER | |
| RUSSELL, DEVON L | |

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| ART UNIT | PAPER NUMBER |
| 3744 | |

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| NOTIFICATION DATE | DELIVERY MODE |
| 07/06/2017 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvm@jvmyers.com
 jp@jvmyers.com
 aap@jvmyers.com



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|---|--------------------------------------|------------------------------------|--|
| <i>Applicant-Initiated Interview Summary</i> | Application No. 14/355,533 | Applicant(s) BOYD ET AL. | |
| | Examiner DEVON RUSSELL | Art Unit 3744 | |

All participants (applicant, applicant's representative, PTO personnel):

(1) DEVON RUSSELL. (3) ____.

(2) Jeffrey Myers. (4) ____.

Date of Interview: 28 June 2017.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: ____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: ____.

Identification of prior art discussed: JP 5956100.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The features of the "plenum" and "weir" of claim 1 were discussed with relation to the art currently of record and the newly appended JP reference. No agreement as to patentability was reached over the phone, but the examiner directed the applicant to file an SB 439 to facilitate further email communications about claim construction prior to the prosecution of a potential RCE.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☒ Attachment

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| /DEVON RUSSELL/ Primary Examiner, Art Unit 3744 | |
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Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.